Digi International

Sigma Pumps Integrated 802.11abg Module

Report #: DGII0053

Report Prepared By Northwest EMC Inc.

NORTHWEST EMC – (888) 364-2378 – www.nwemc.com

California – Minnesota – Oregon – New York – Washington

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Last Date of Test: March 21, 2012
Digi International
Model: Sigma Pumps Integrated 802.11abg Module

Emissions

Test Description	Specification	Test Method	Pass/Fail
Duty Cycle	FCC 15.247:2012	ANSI C63.10:2009	**Pass**
Occupied Bandwidth	FCC 15.247:2012	ANSI C63.10:2009	**Pass**
Output Power	FCC 15.247:2012	ANSI C63.10:2009	**Pass**
Band Edge Compliance	FCC 15.247:2012	ANSI C63.10:2009	**Pass**
Spurious Conducted Emissions	FCC 15.247:2012	ANSI C63.10:2009	**Pass**
Power Spectral Density	FCC 15.247:2012	ANSI C63.10:2009	**Pass**
Spurious Radiated Emissions	FCC 15.247:2012	ANSI C63.10:2009	**Pass**
AC Powerline Conducted Emissions	FCC 15.207:2012	ANSI C63.10:2009	**Pass**

Deviations From Test Standards

None

Approved By:

Tim O'Shea, Operations Manager

NVLAP Lab Code: 200881-0

Test Facility

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.
9349 W Broadway Ave.
Brooklyn Park, MN 55445

Phone: (763) 425-2281 Fax: (763) 424-3469

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada (Site filing #2834E-1).

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test.

Revision History

Revision Number	Description	Date	Page Number
00	None		

Accreditations and Authorizations

Revision
02/21/2012

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC Guide 65 as a product certifier. This allows Northwest EMC to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025. The scope includes radio, ITE, and medical standards from around the world. See: http://www.nwemc.com/accreditations/

Canada

IC - Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

European Union

European Commission – Validated by the European Commission as a Conformity Assessment Body (CAB) under the EMC directive and as a Notified Body under the R&TTE Directive.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

KCC / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Hong Kong

OFTA – Recognized by OFTA as a CAB for the acceptance of test data.

Vietnam

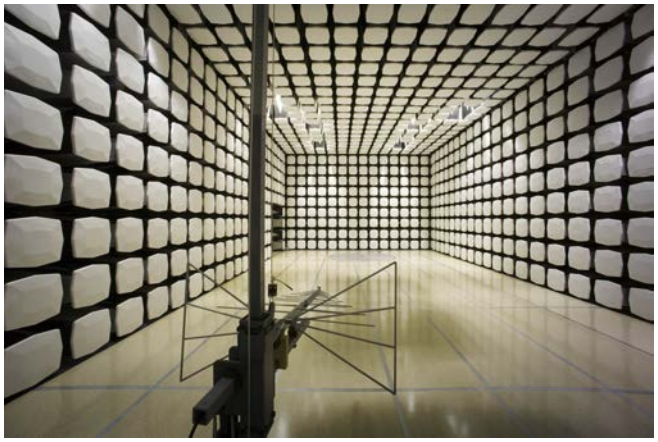
MIC – Recognized by MIC as a CAB for the acceptance of test data.

Russia

GOST – Accredited by Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC to perform EMC and Hygienic testing for Information Technology products to GOST standards**.**

Locations

Oregon	California	New York	Minnesota	Washington
Labs EV01-EV12 22975 NW Evergreen Pkwy, #400 Hillsboro, OR 97124 (503) 844-4066	Labs OC01-OC13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs WA01-WA04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	Labs MN01-MN08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281	Labs SU01-SU07 14128 339th Ave. SE Sultan, WA 98294 (360) 793-8675
VCCI				
C-1071, R-1025, G-84, C-2687, T-1658, R-2318	R-1943, G-85, C-2766, T-1659, G-548		R-3125, G-86, G-141, C-3464, T-1634	R-871, G-83, C-3265, T-1511
Industry Canada				
2834D-1, 2834D-*2*	2834B-1, 2834B-2, 2834B-3		2834E-1	2834C-1



Product Description

Client and Equipment Under Test (EUT) Information

Company Name:	Digi International
Address:	11001 Bren Road East
City, State, Zip:	Minnetonka, MN 55343
Test Requested By:	Slava Gekht
Model:	Sigma Pumps Integrated 802.11abg Module
First Date of Test:	March 16, 2012
Last Date of Test:	March 21, 2012
Receipt Date of Samples:	March 14, 2012
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):
Sigma Pumps Integrated 802.11abg Module

Testing Objective:
To demonstrate compliance of a radio module under FCC 15.247 for operation in the 2.4 an 5.8 GHz bands

Configurations

Configuration 1 DGII0053

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
802.11abg Module	Digi International	30012522-07 Rev A	7.06

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Power Supply	GlobTek	GT-41060-2512	3509
Dev Board	Digi International	None	2.01

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	HP	NC6320	CNU7062VS5
Laptop Supply	HP	PPP014L-S	8454846603

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power	No	2.4m	No	Power Supply	AC Mains
DC Power	No	1.8m	Yes	802.11abg Module	Power Supply
AC Power	No	1.8m	No	Laptop Supply	AC Mains
DC Power	No	1.8m	Yes	Laptop	Laptop Supply
Serial	Yes	> 3.0m	No	802.11abg Module	Laptop
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Configuration 2 DGII0053

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
802.11abg Module	Digi International	30012522-07 Rev A	7.06

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Power Supply	GlobTek	GT-41060-2512	3509
Laptop	HP	NC6320	CNU7062VS5
Laptop Supply	HP	PPP014L-S	8454846603
Dev Board	Digi International	None	2.01

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power	No	1.8m	Yes	802.11abg Module	Power Supply
AC Power	No	1.8m	No	Laptop Supply	AC Mains
DC Power	No	1.8m	Yes	Laptop	Laptop Supply
Serial	Yes	1.2m	No	802.11abg Module	Laptop
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Modifications

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	3/16/2012	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	3/20/2012	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
3	3/20/2012	Duty cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
4	3/20/2012	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
5	3/20/2012	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
6	3/20/2012	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
7	3/20/2012	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
8	3/21/2012	AC Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Duty Cycle

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator SMA - 20dB, 40 GHz	Fairview Microwave	SA4014-20	AQI	10/12/2011	12
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Signal Generator	Agilent	N5183A	TIA	1/27/2012	12
Spectrum Analyzer	Agilent	E4446A	AAT	3/2/2012	12

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

For transmitters which are not operated at a continuous transmission of 100% duty cycle, the duty cycle must be measured.

The observed duty cycle is expressed in terms of a percentage and is calculated as:

Duty Cycle = (Tx on / (Tx on + Tx off))

The observed duty cycle was measured for each available modulation and data rate

Duty Cycle

EUT:	Sigma Pumps Integrated 802.11abg Module	**Work Order:**	DGII0053
Serial Number:	7.06	**Date:**	03/20/12
Customer:	Digi International	**Temperature:**	22.78°C
Attendees:	None	**Humidity:**	55%
Project:	None	**Barometric Pres.:**	1007.8
Tested by:	Johnathan Lee	**Power:** 110VAC/60Hz	**Job Site:** MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2012	ANSI C63.10:2009

COMMENTS

Added second harmonic filter on 5GHz path (footprint exists on board for this filter). Channel 149, 157, 165: Power level 50. Channels 1, 6, 11 at 1 Mbps, 11 Mbps and Channel 6 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 60. Channel 1 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 45. Channel 11 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 50. This data represents normal operation of the device. The other tests in this report were performed at a duty cycle of 100%. Tx frame period set to 20ms, 1Mbps was set to 30ms.

DEVIATIONS FROM TEST STANDARD

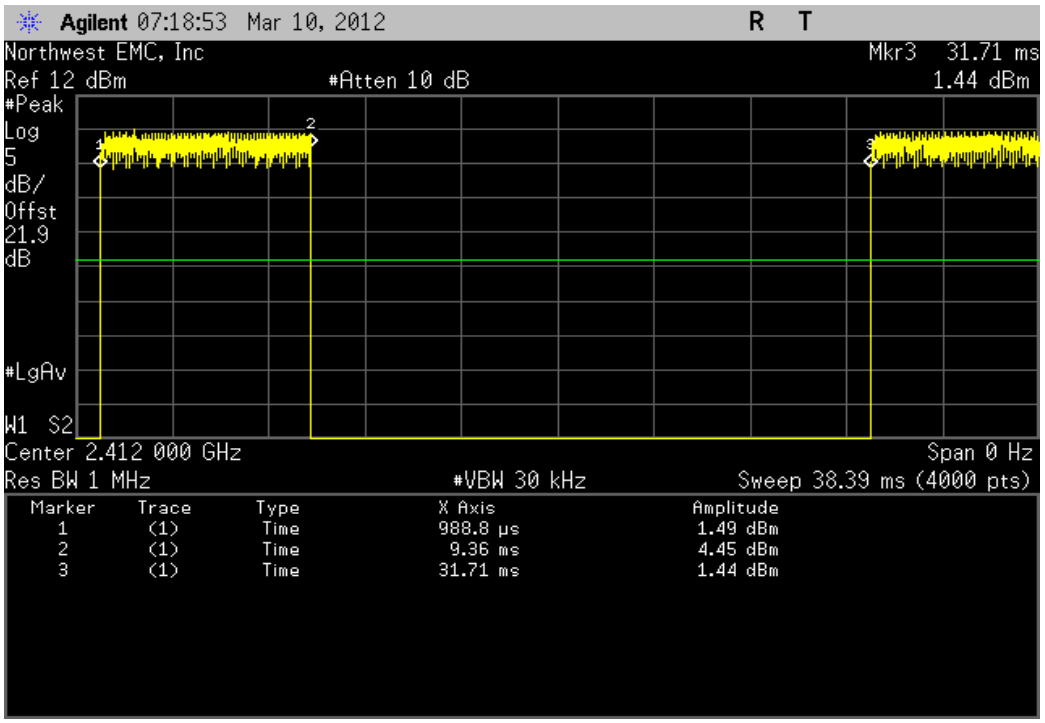
None

Configuration #	2	Signature	Trevor Bulls

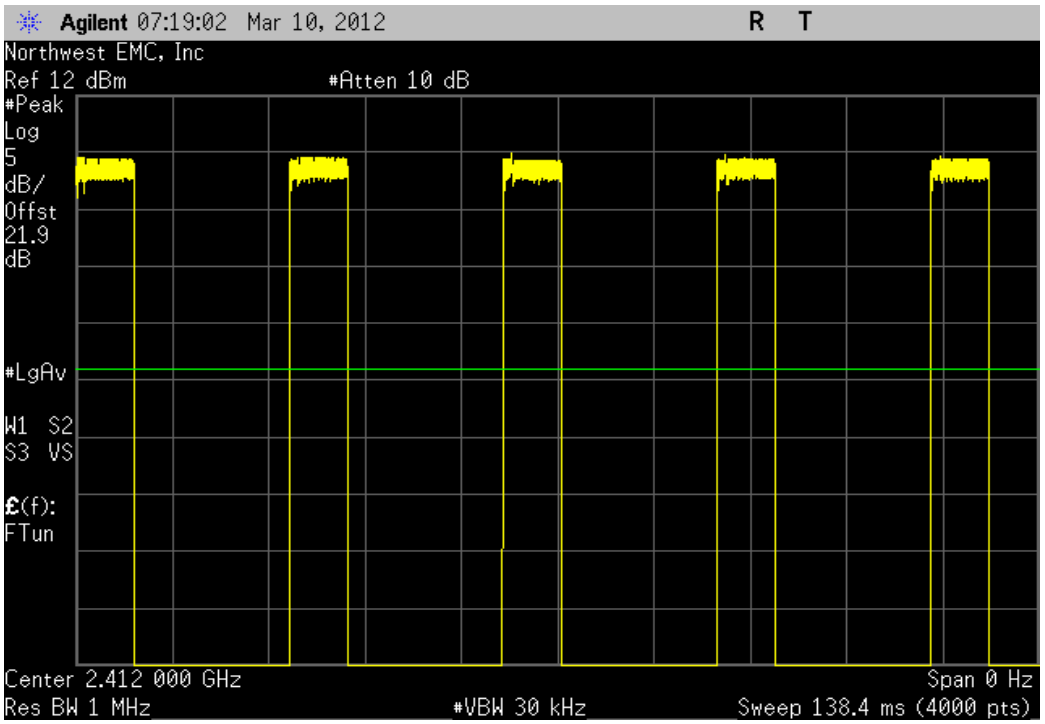
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
2400 MHz - 2483.5 MHz Band						
802.11(b) 1 Mbps						
Low Channel 1, 2412 MHz	8.371 mS	30.72 mS	1	27%	N/A	N/A
Low Channel 1, 2412 MHz			5		N/A	N/A
Mid Channel 6, 2437 MHz	8.381 mS	30.72 mS	1	27%	N/A	N/A
Mid Channel 6, 2437 MHz			5		N/A	N/A
High Channel 11, 2462 MHz	8.381 mS	30.72 mS	1	27%	N/A	N/A
High Channel 11, 2462 MHz			5		N/A	N/A
802.11(b) 11 Mbps						
Low Channel 1, 2412 MHz	922.9 uS	20.481 mS	1	5%	N/A	N/A
Low Channel 1, 2412 MHz			5		N/A	N/A
Mid Channel 6, 2437 MHz	922.8 uS	20.472 mS	1	5%	N/A	N/A
Mid Channel 6, 2437 MHz			5		N/A	N/A
High Channel 11, 2462 MHz	922.9 uS	20.481 mS	1	5%	N/A	N/A
High Channel 11, 2462 MHz			5		N/A	N/A
802.11(g) 6 Mbps						
Low Channel 1, 2412 MHz	1.38 mS	20.481 mS	1	7%	N/A	N/A
Low Channel 1, 2412 MHz			5		N/A	N/A
Mid Channel 6, 2437 MHz	1.38 mS	20.481 mS	1	7%	N/A	N/A
Mid Channel 6, 2437 MHz			5		N/A	N/A
High Channel 11, 2462 MHz	1.38 mS	20.481 mS	1	7%	N/A	N/A
High Channel 11, 2462 MHz			5		N/A	N/A
802.11(g) 36 Mbps						
Low Channel 1, 2412 MHz	237.1 uS	20.481 mS	1	1%	N/A	N/A
Low Channel 1, 2412 MHz			5		N/A	N/A
Mid Channel 6, 2437 MHz	245.5 uS	20.481 mS	1	1%	N/A	N/A
Mid Channel 6, 2437 MHz			5		N/A	N/A
High Channel 11, 2462 MHz	237.1 uS	20.481 mS	1	1%	N/A	N/A
High Channel 11, 2462 MHz			5		N/A	N/A
802.11(g) 54 Mbps						
Low Channel 1, 2412 MHz	160.9 uS	20.481 mS	1	1%	N/A	N/A
Low Channel 1, 2412 MHz			5		N/A	N/A
Mid Channel 6, 2437 MHz	160.9 uS	20.481 mS	1	1%	N/A	N/A
Mid Channel 6, 2437 MHz			5		N/A	N/A
High Channel 11, 2462 MHz	160.9 uS	20.481 mS	1	1%	N/A	N/A
High Channel 11, 2462 MHz			5		N/A	N/A
5725 MHz - 5850 MHz Band						
802.11(a) 6 Mbps						
Low Channel 149, 5745 MHz	1.38 mS	20.481 mS	1	7%	N/A	N/A
Low Channel 149, 5745 MHz			5		N/A	N/A
Mid Channel 157, 5785 MHz	1.38 mS	20.481 mS	1	7%	N/A	N/A
Mid Channel 157, 5785 MHz			5		N/A	N/A
High Channel 165, 5825 MHz	1.389 mS	20.481 mS	1	7%	N/A	N/A
High Channel 165, 5825 MHz			5		N/A	N/A
802.11(a) 36 Mbps						
Low Channel 149, 5745 MHz	237.1 uS	20.481 mS	1	1%	N/A	N/A
Low Channel 149, 5745 MHz			5		N/A	N/A
Mid Channel 157, 5785 MHz	237.1 uS	20.481 mS	1	1%	N/A	N/A
Mid Channel 157, 5785 MHz			5		N/A	N/A
High Channel 165, 5825 MHz	237.1 uS	20.472 mS	1	1%	N/A	N/A
High Channel 165, 5825 MHz			5		N/A	N/A
802.11(a) 54 Mbps						
Low Channel 149, 5745 MHz	169.4 uS	20.481 mS	1	1%	N/A	N/A
Low Channel 149, 5745 MHz			5		N/A	N/A
Mid Channel 157, 5785 MHz	160.9 uS	20.481 mS	1	1%	N/A	N/A
Mid Channel 157, 5785 MHz			5		N/A	N/A
High Channel 165, 5825 MHz	160.9 uS	20.472 mS	1	1%	N/A	N/A
High Channel 165, 5825 MHz			5		N/A	N/A

Duty Cycle

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	8.371 mS	30.72 mS	1	27.20%	N/A	N/A

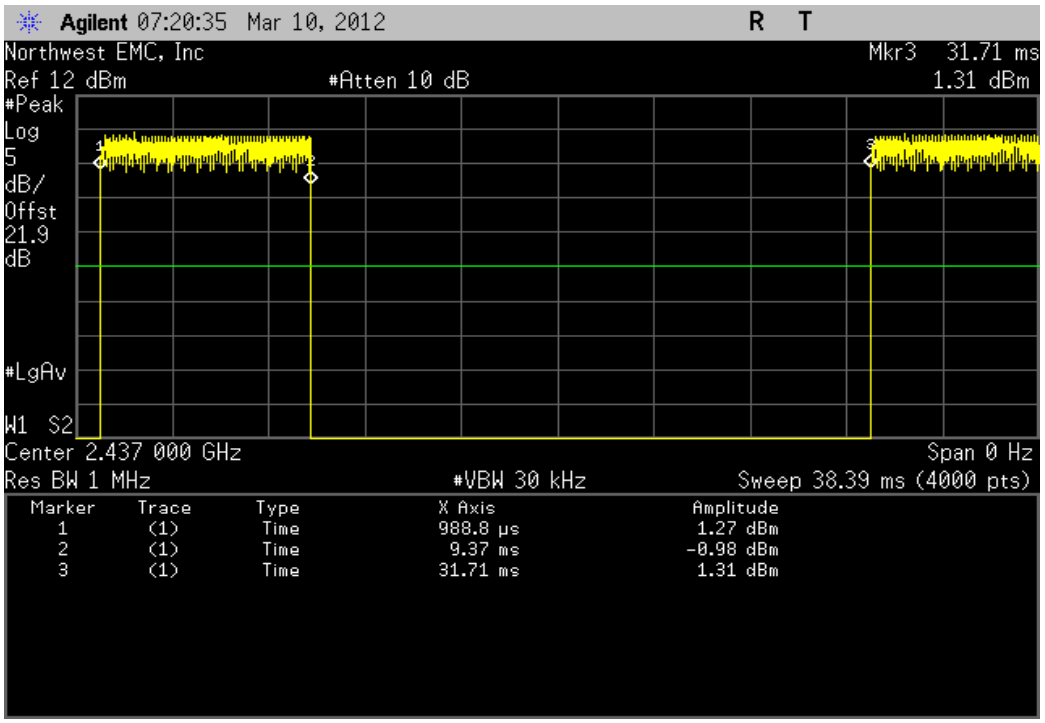


2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

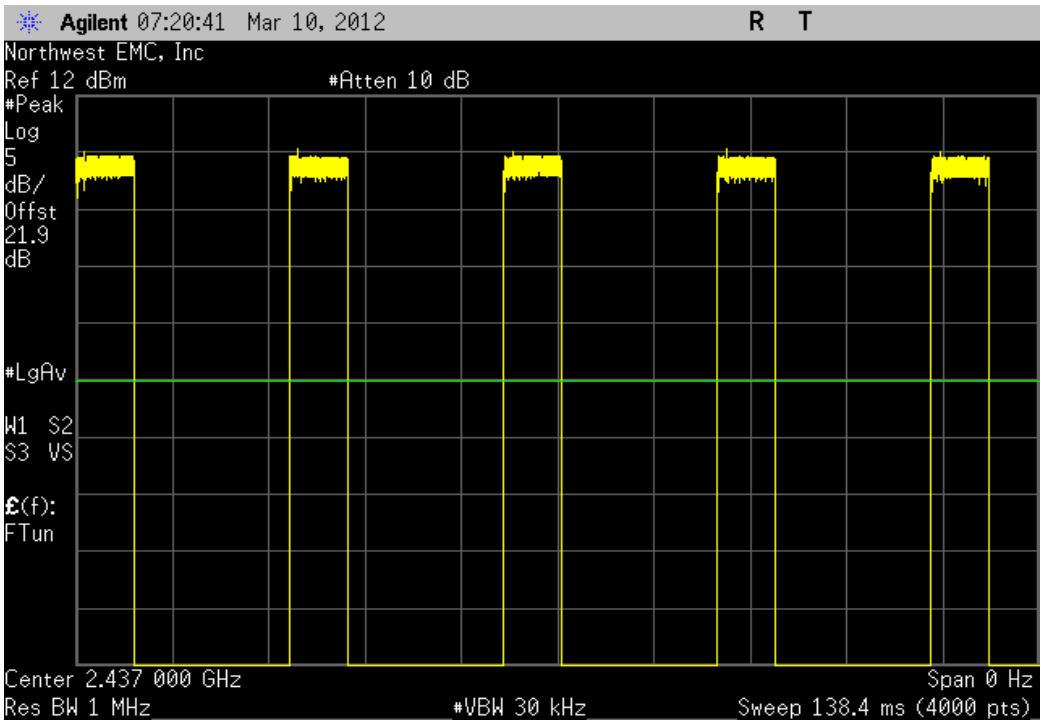


Duty Cycle

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	8.381 mS	30.72 mS	1	27.30%	N/A	N/A

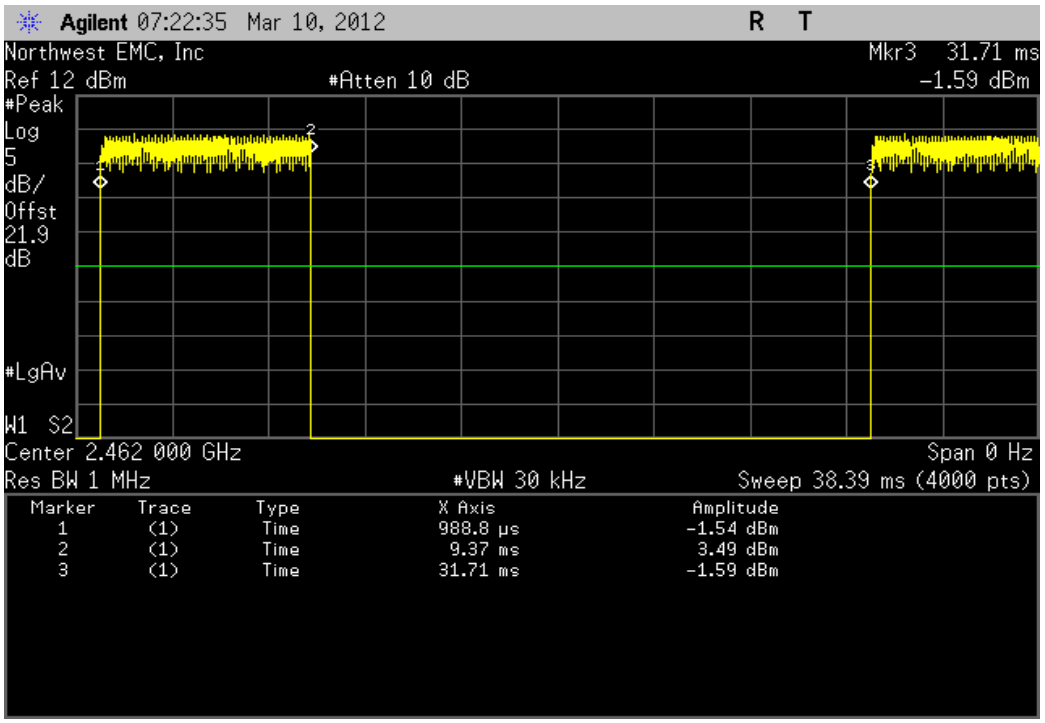


2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

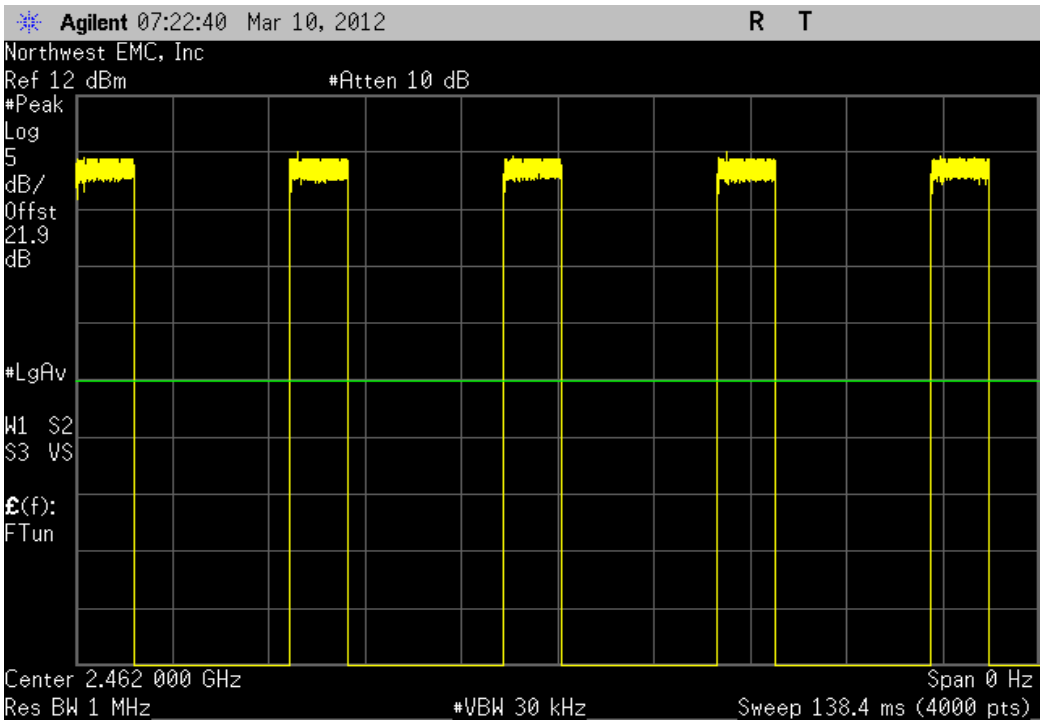


Duty Cycle

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	8.381 mS	30.72 mS	1	27.30%	N/A	N/A

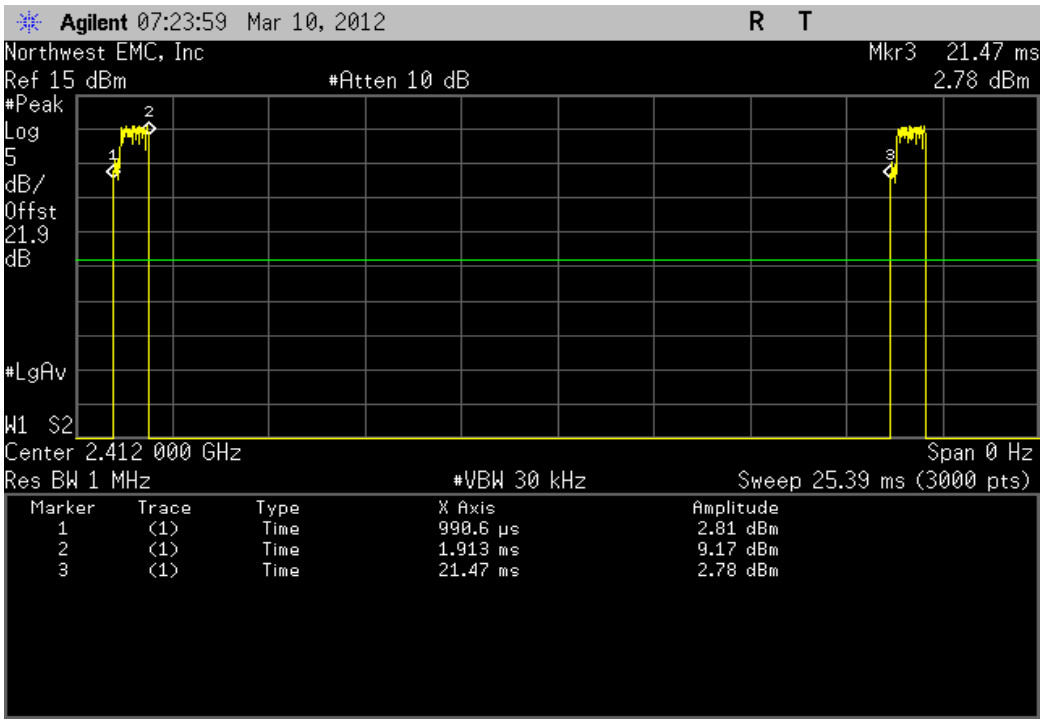


2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

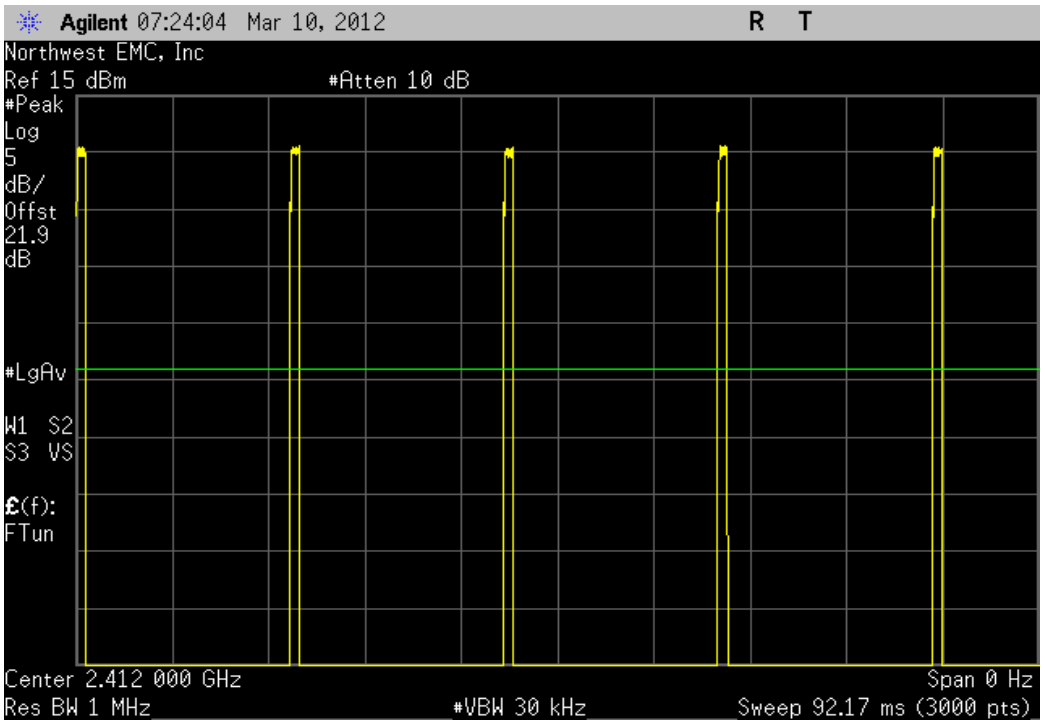


Duty Cycle

2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	922.9 uS	20.481 mS	1	4.50%	N/A	N/A

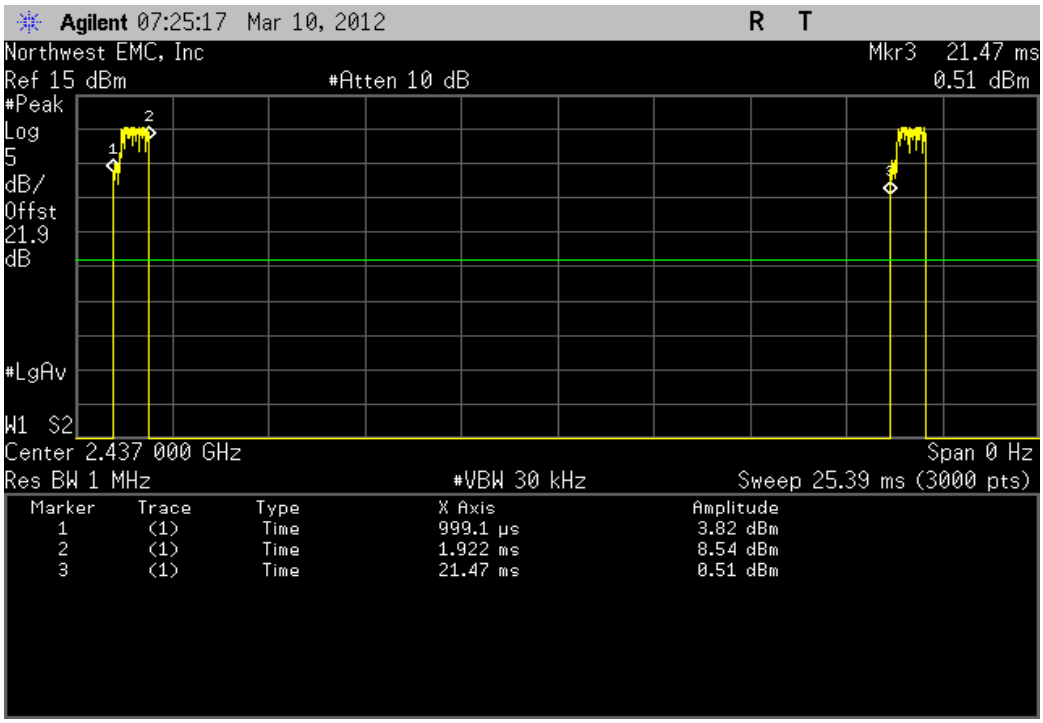


2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

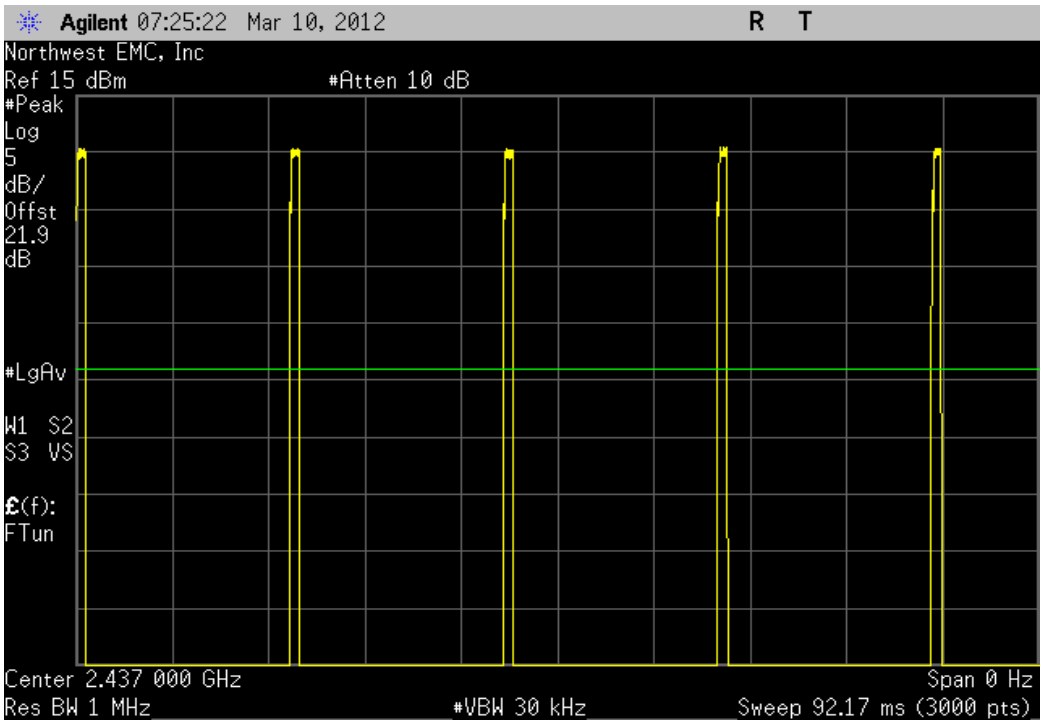


Duty Cycle

2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	922.8 uS	20.472 mS	1	4.50%	N/A	N/A

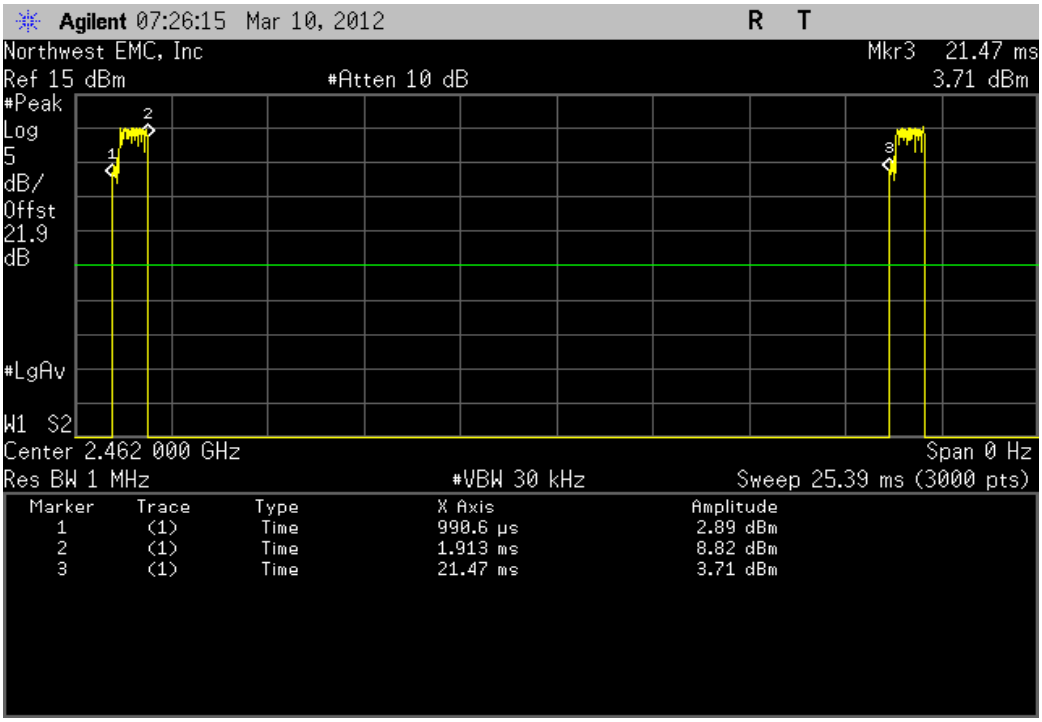


2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

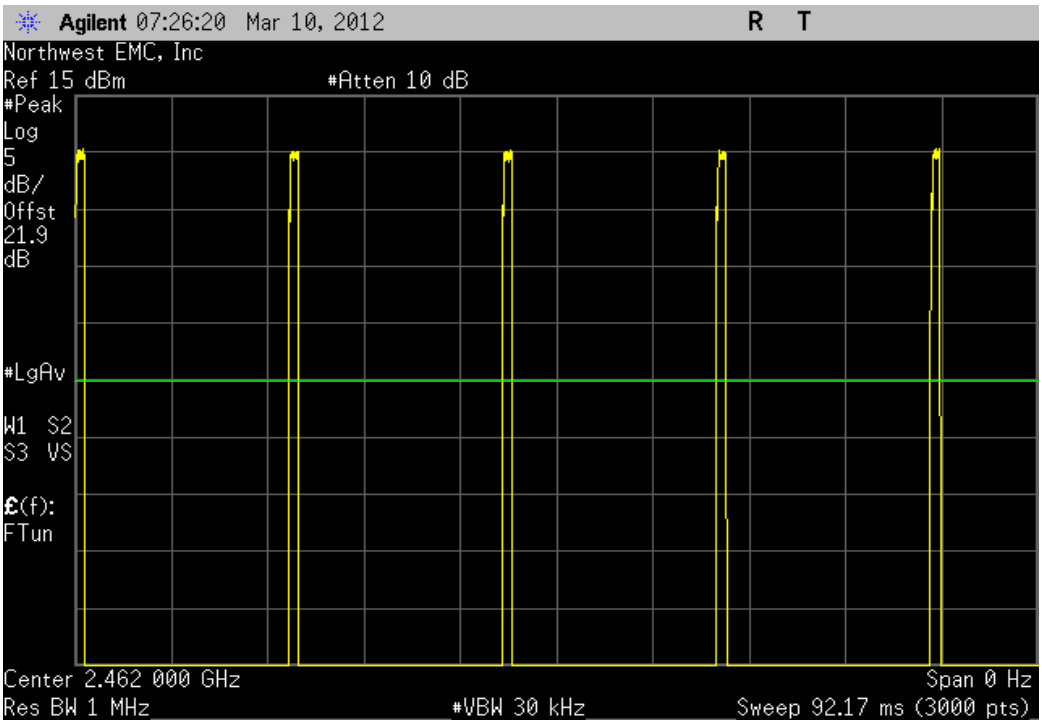


Duty Cycle

2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	922.9 uS	20.481 mS	1	4.50%	N/A	N/A

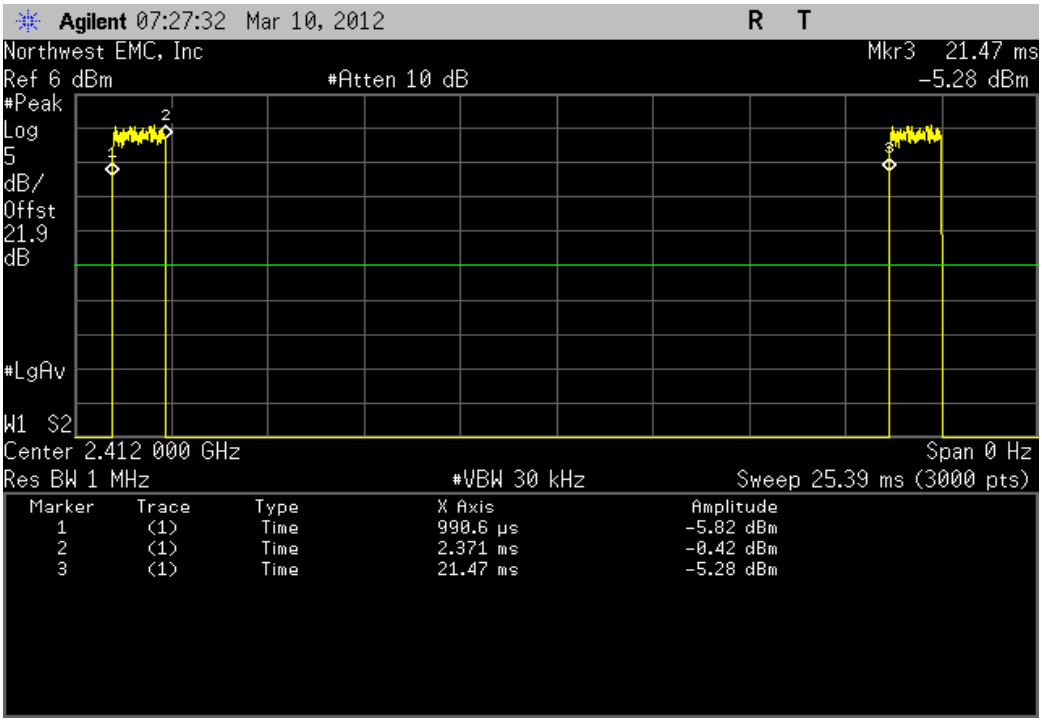


2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

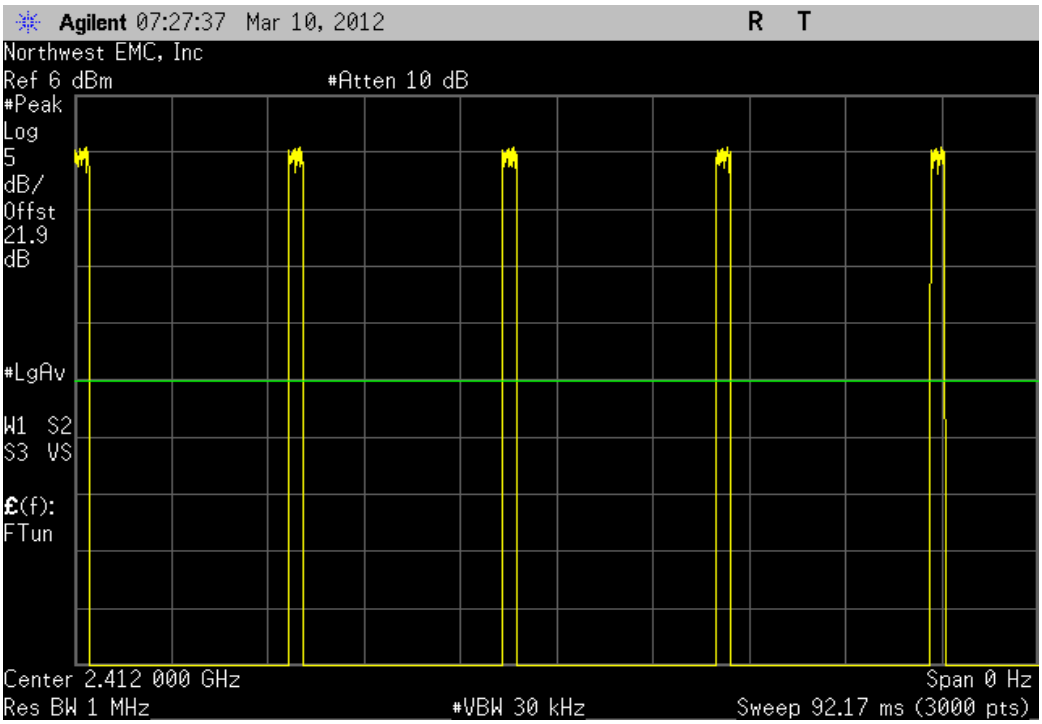


Duty Cycle

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	1.38 mS	20.481 mS	1	6.70%	N/A	N/A

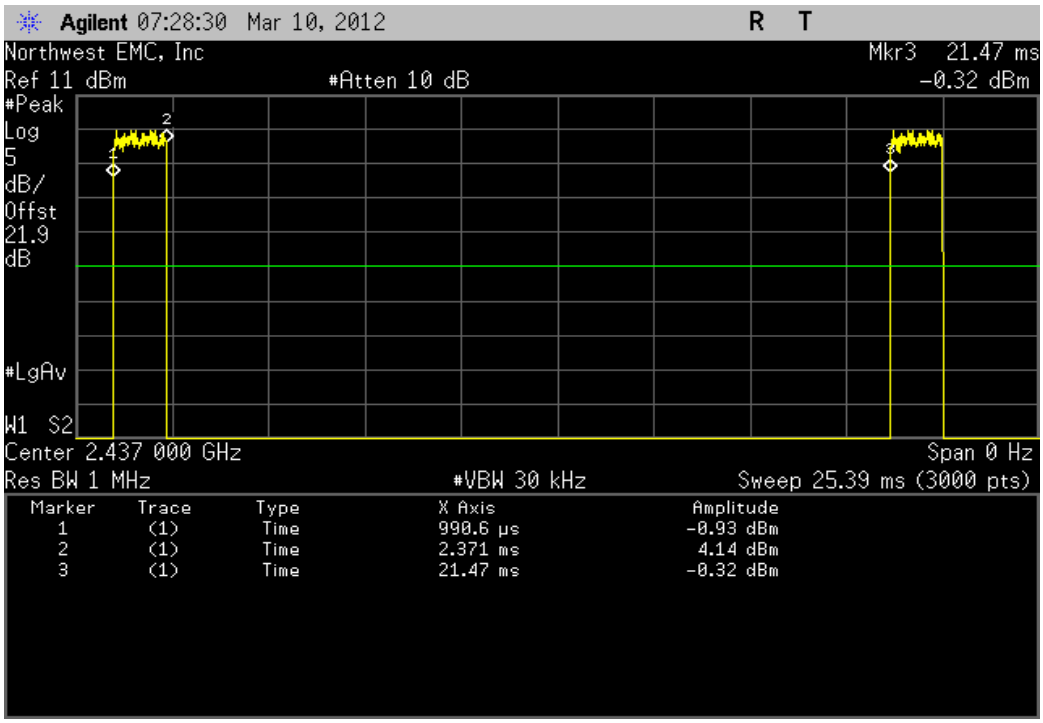


2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

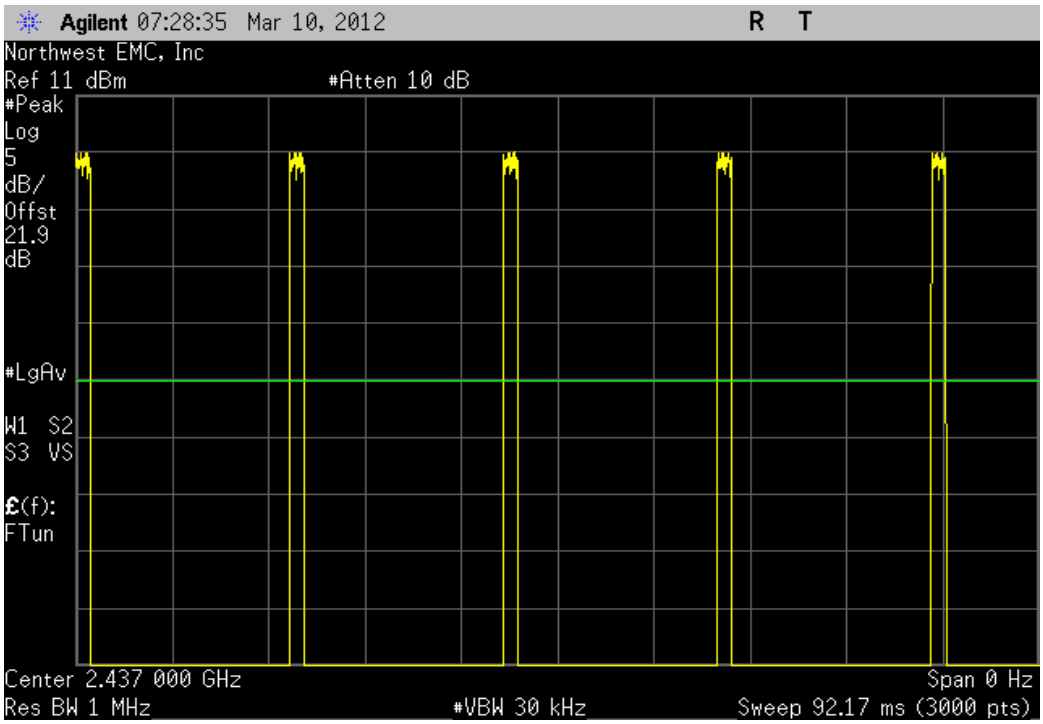


Duty Cycle

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	1.38 mS	20.481 mS	1	6.70%	N/A	N/A

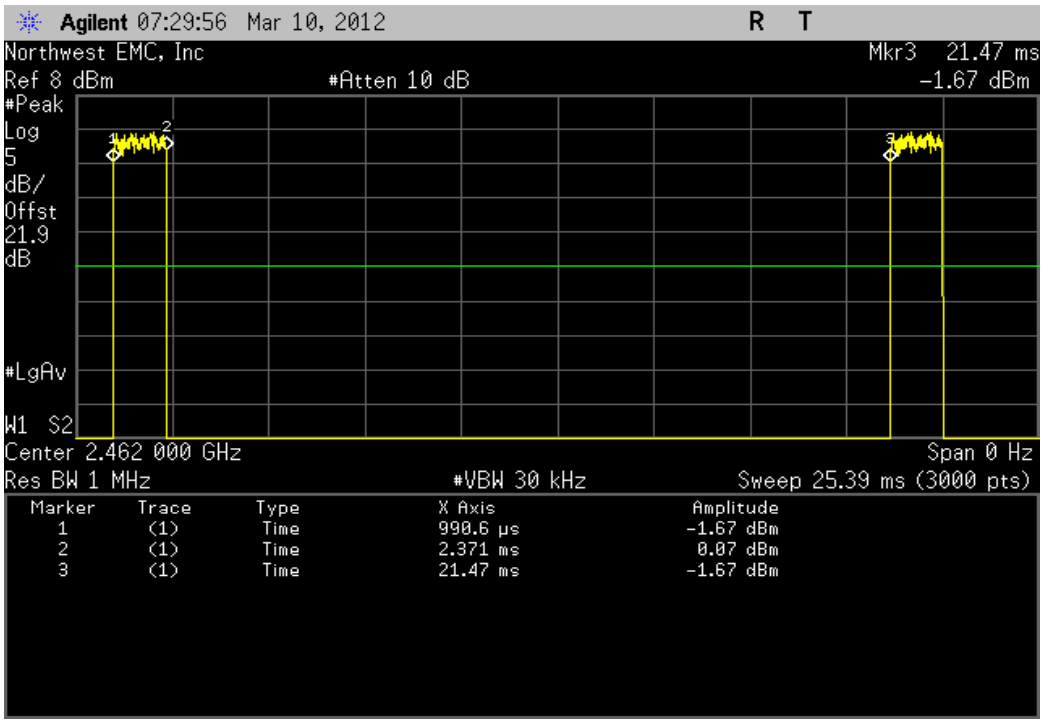


2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

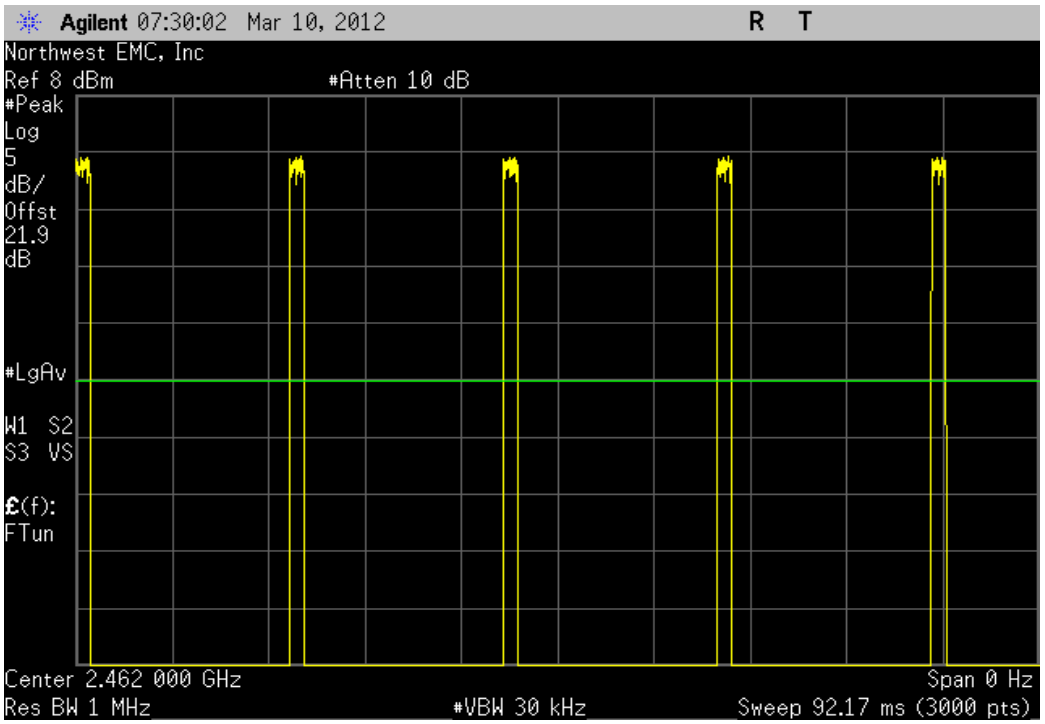


Duty Cycle

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	1.38 mS	20.481 mS	1	6.70%	N/A	N/A

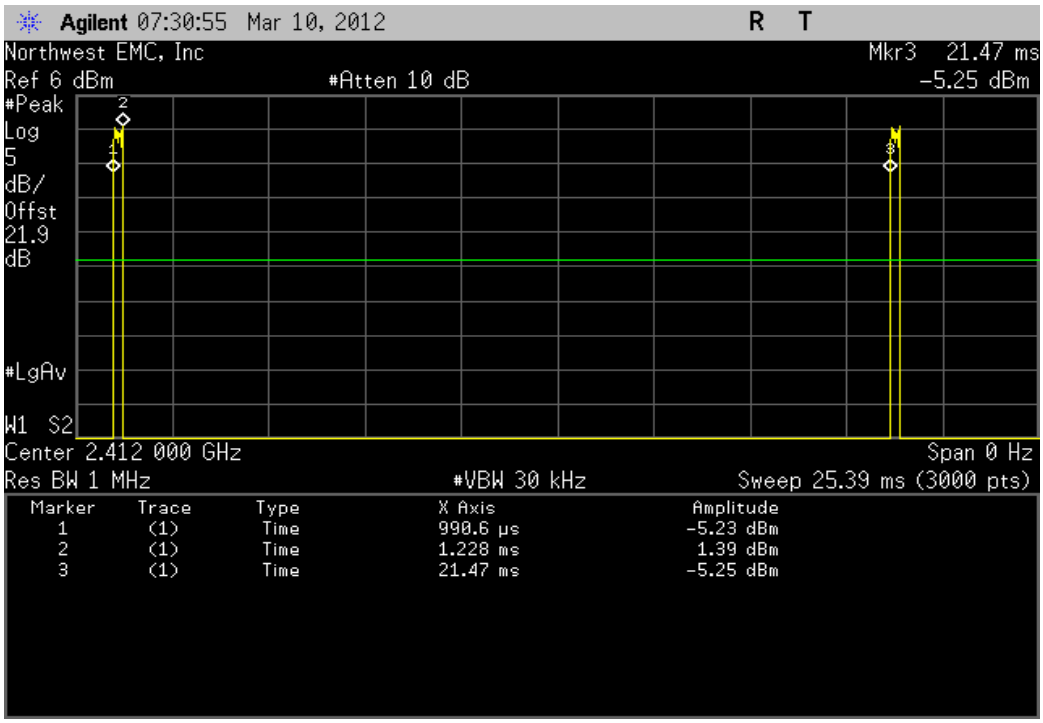


2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

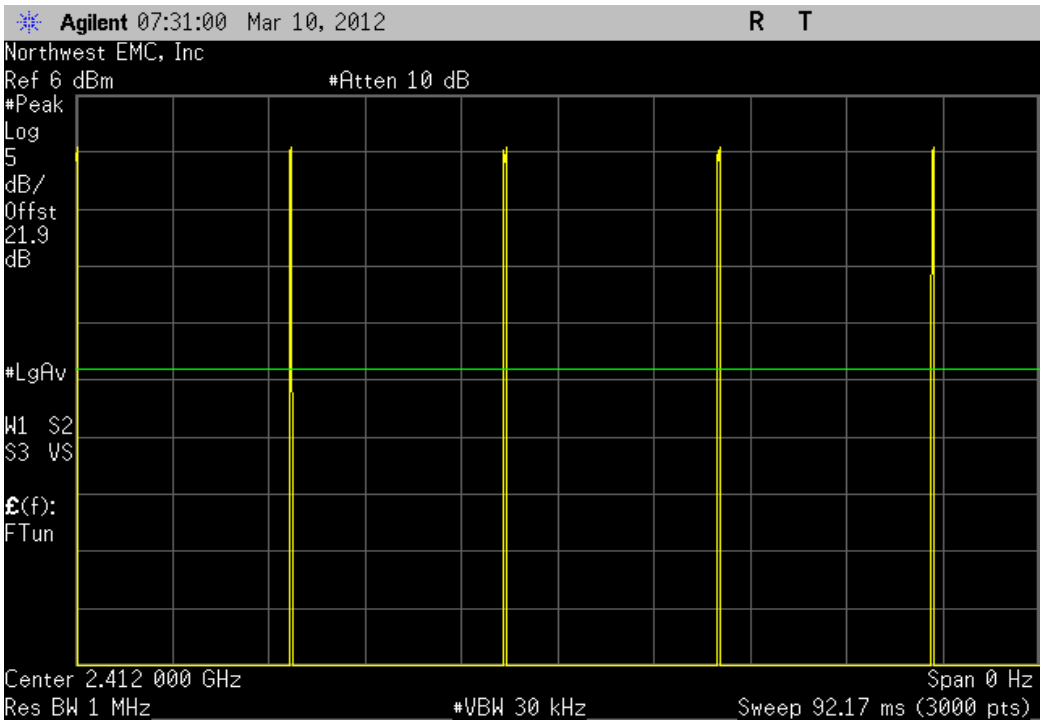


Duty Cycle

2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	237.1 uS	20.481 mS	1	1.20%	N/A	N/A

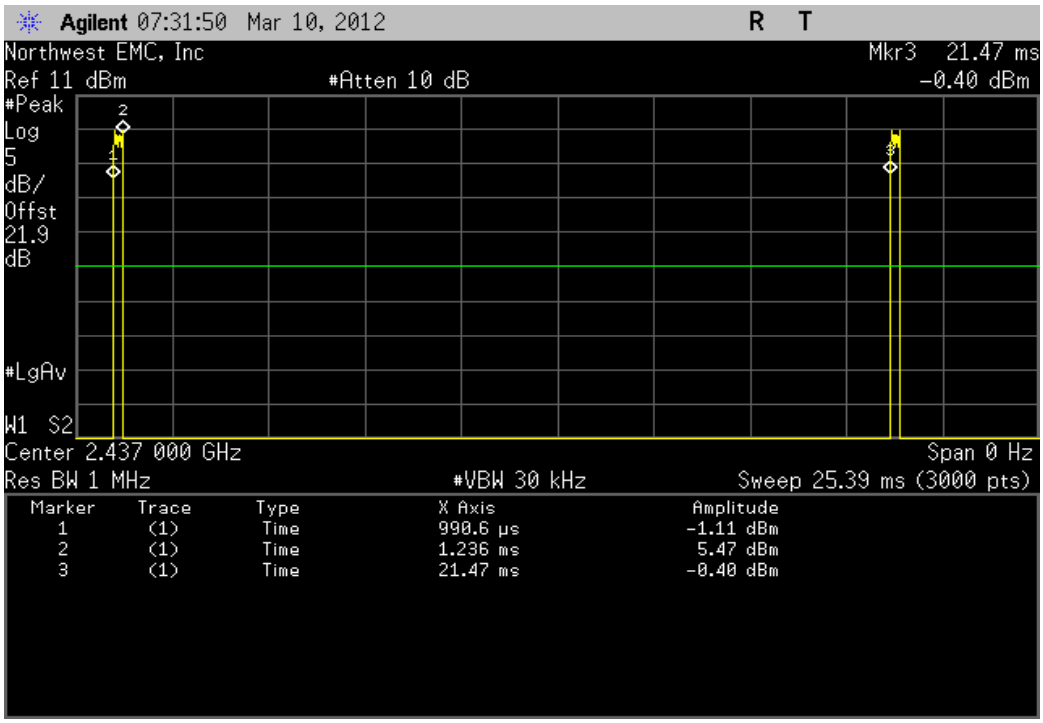


2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

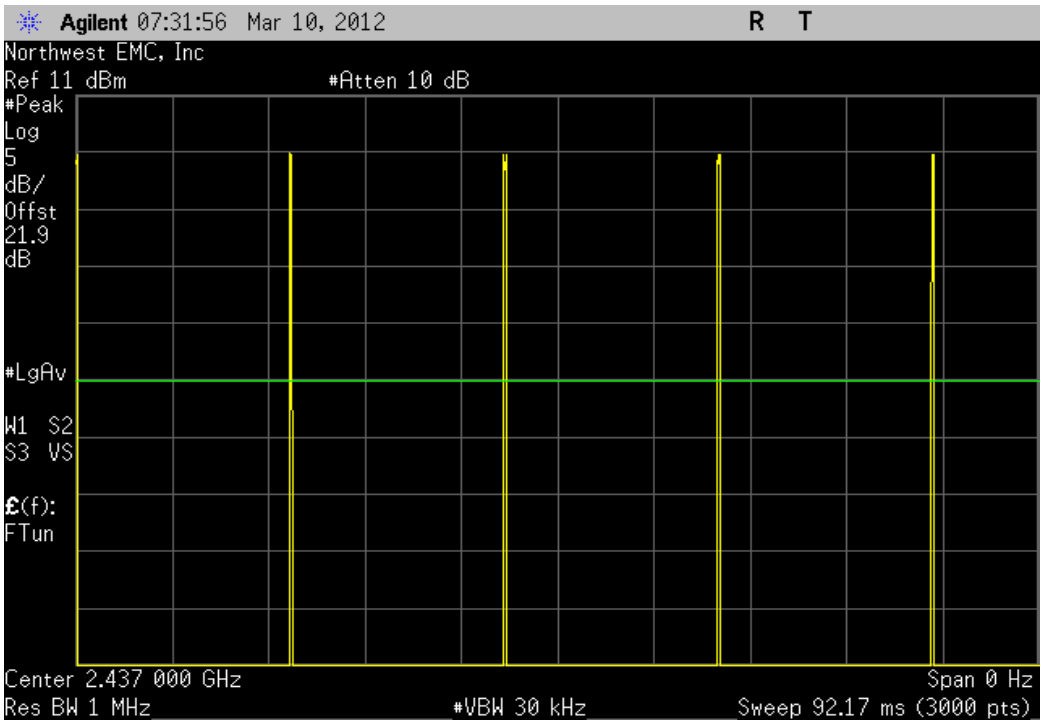


Duty Cycle

2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	245.5 uS	20.481 mS	1	1.20%	N/A	N/A

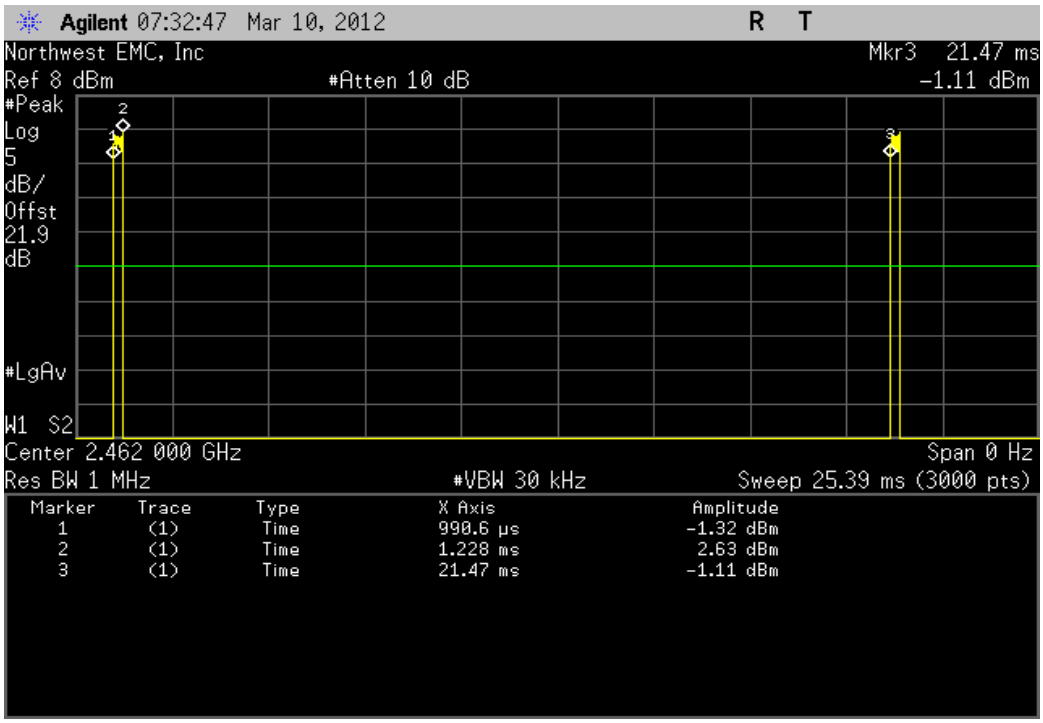


2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

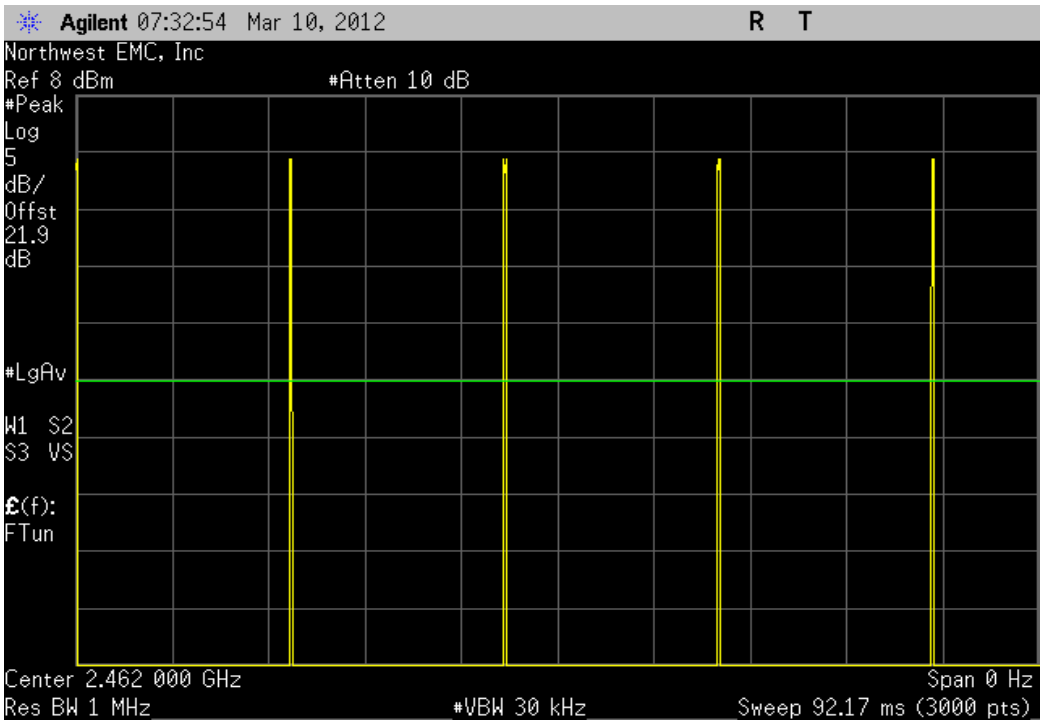


Duty Cycle

2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	237.1 uS	20.481 mS	1	1.20%	N/A	N/A

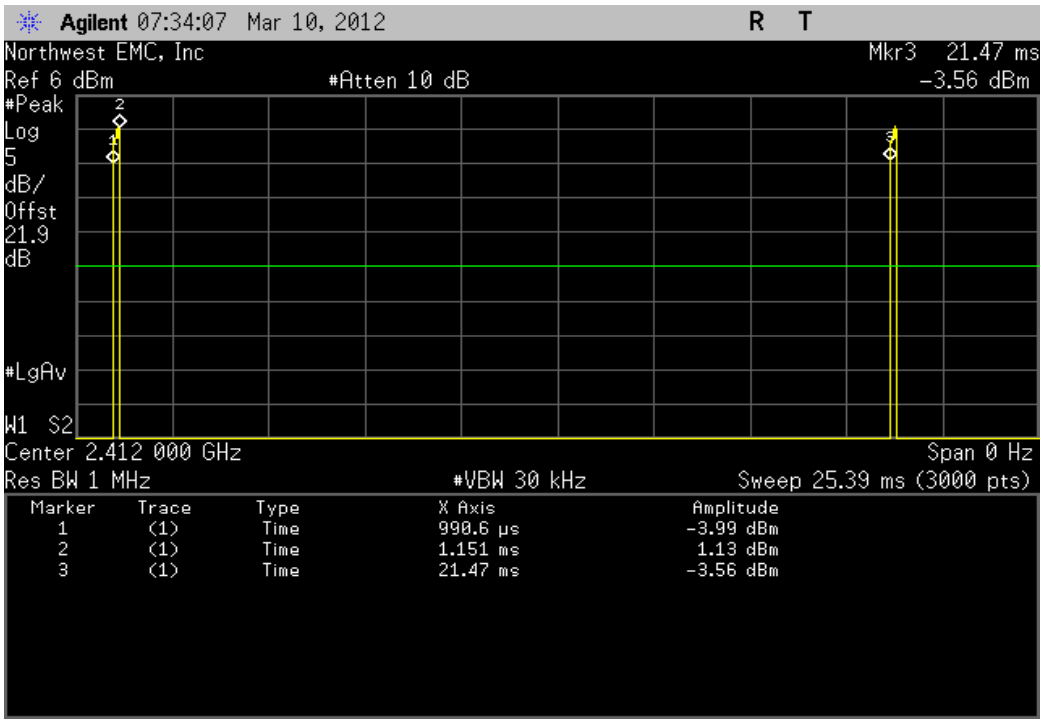


2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

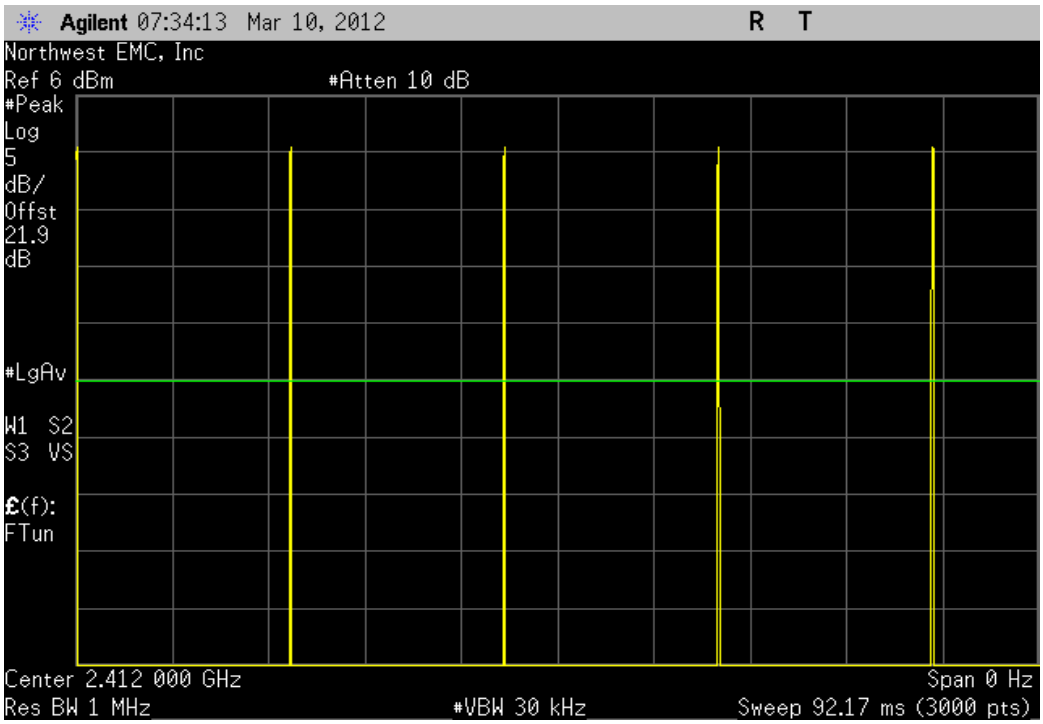


Duty Cycle

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	160.9 uS	20.481 mS	1	0.80%	N/A	N/A

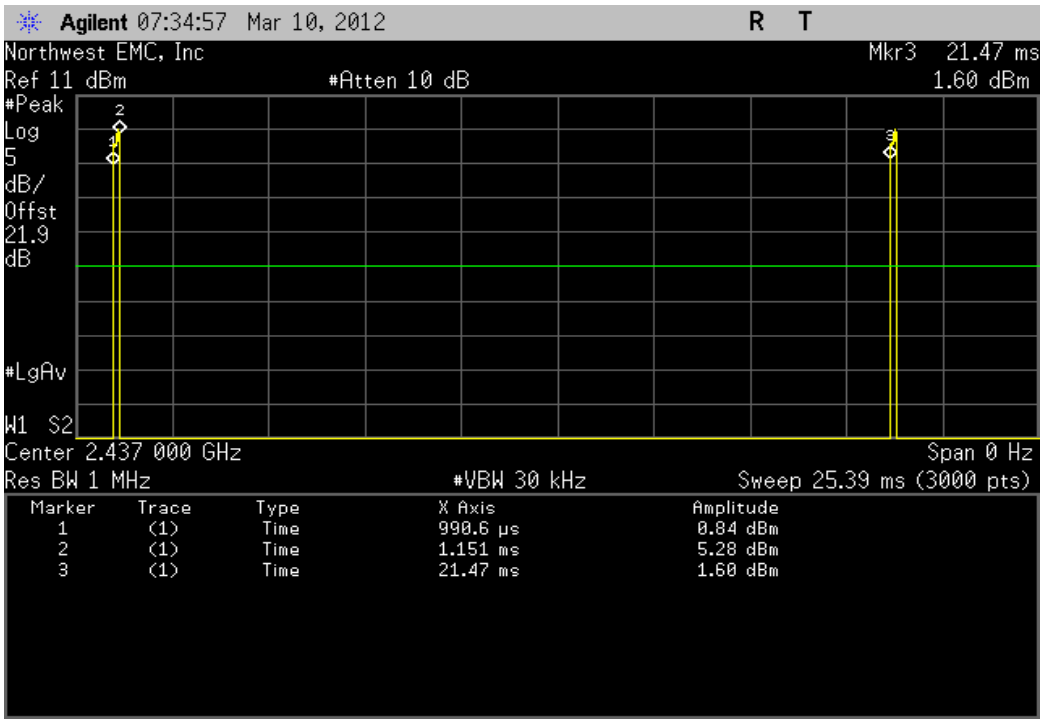


2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

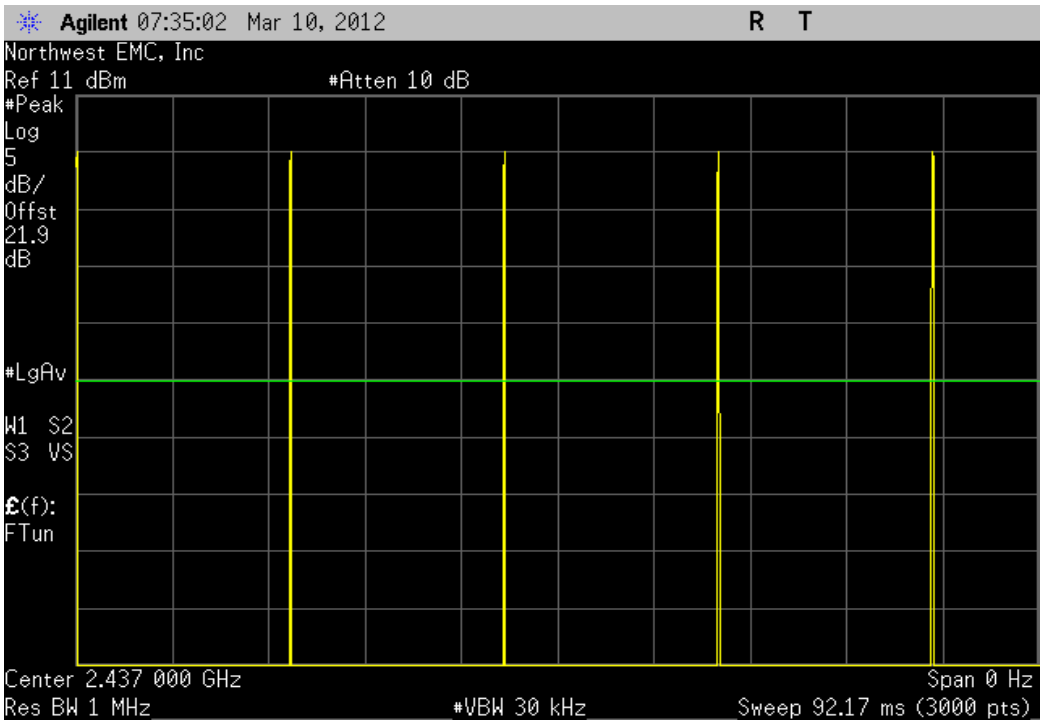


Duty Cycle

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	160.9 uS	20.481 mS	1	0.80%	N/A	N/A

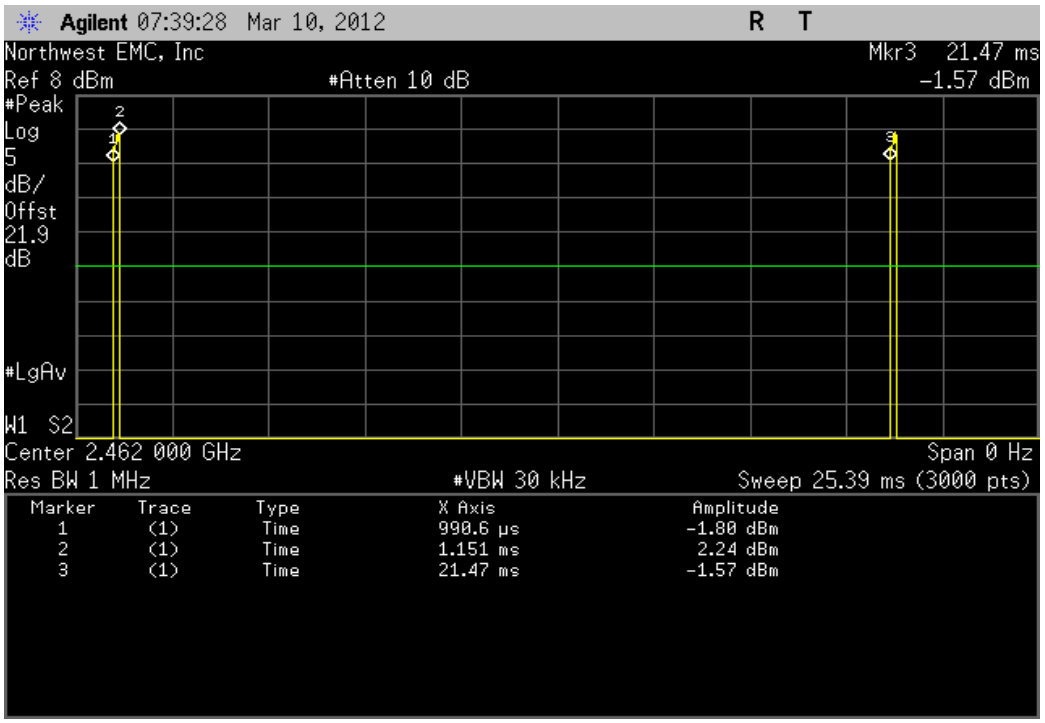


2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

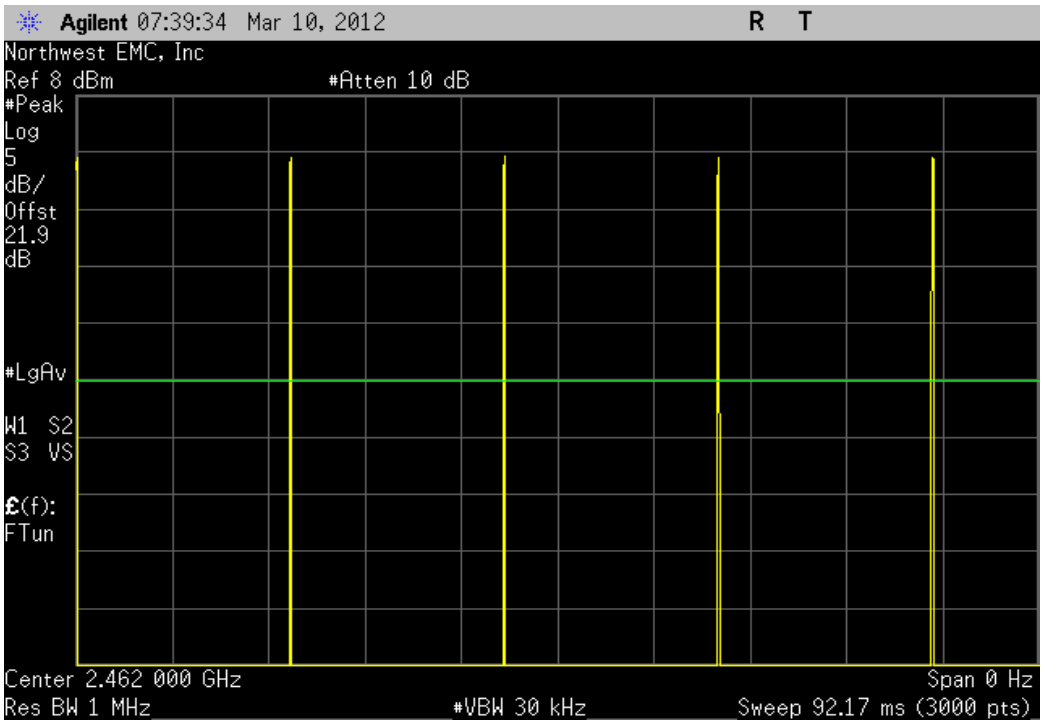


Duty Cycle

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	160.9 uS	20.481 mS	1	0.80%	N/A	N/A

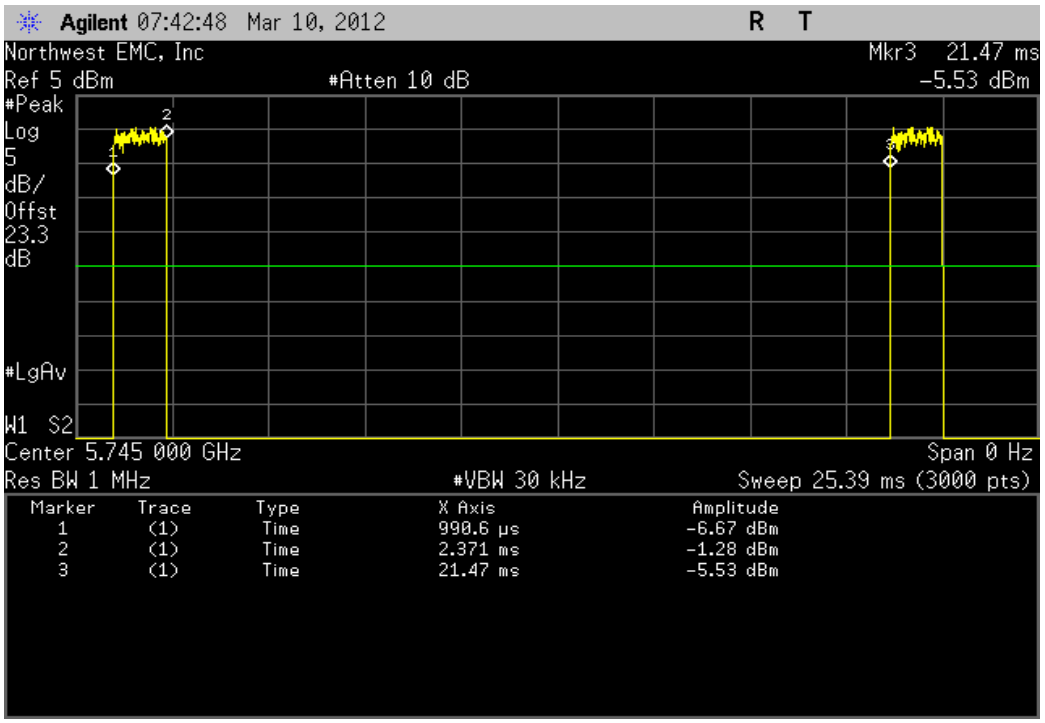


2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

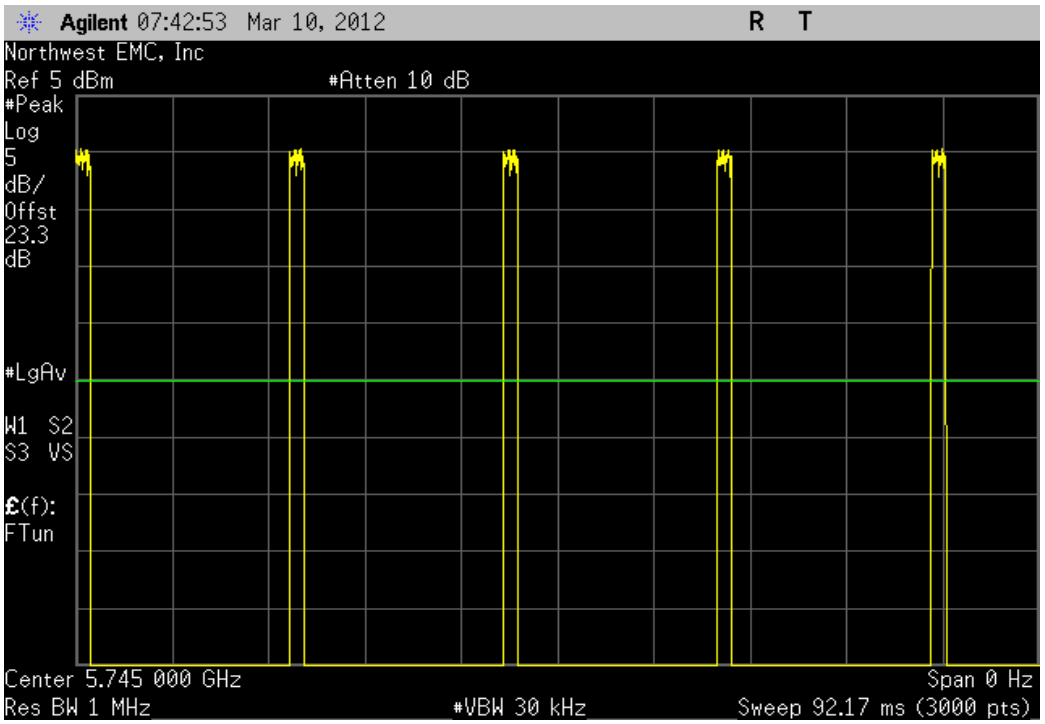


Duty Cycle

5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Low Channel 149, 5745 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	1.38 mS	20.481 mS	1	6.70%	N/A	N/A

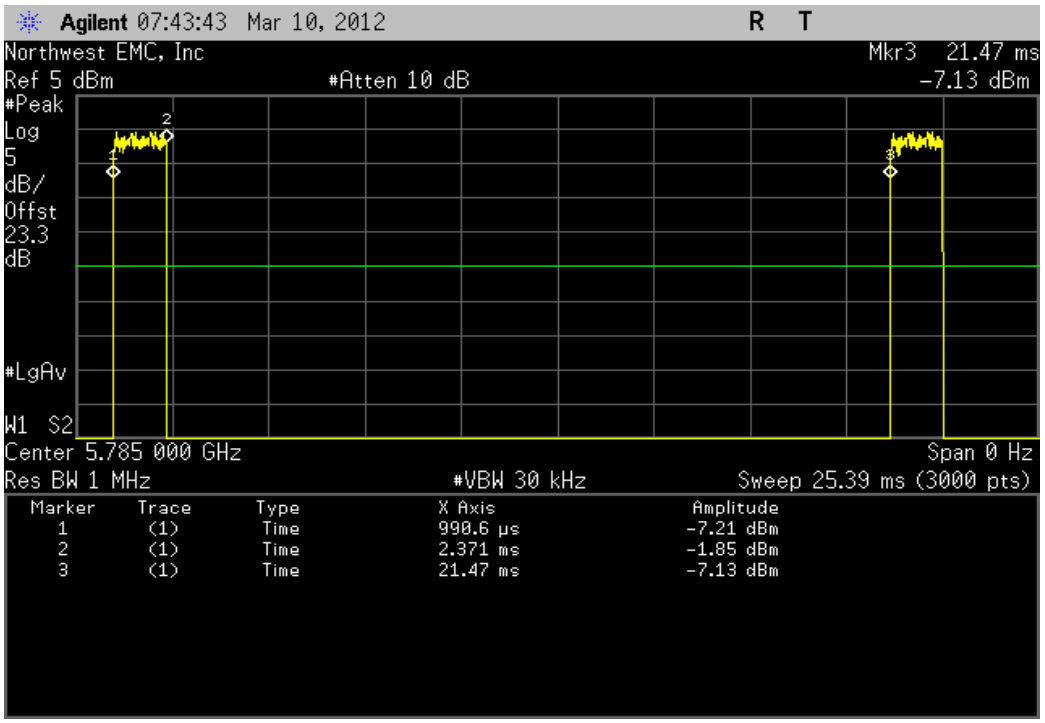


5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Low Channel 149, 5745 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

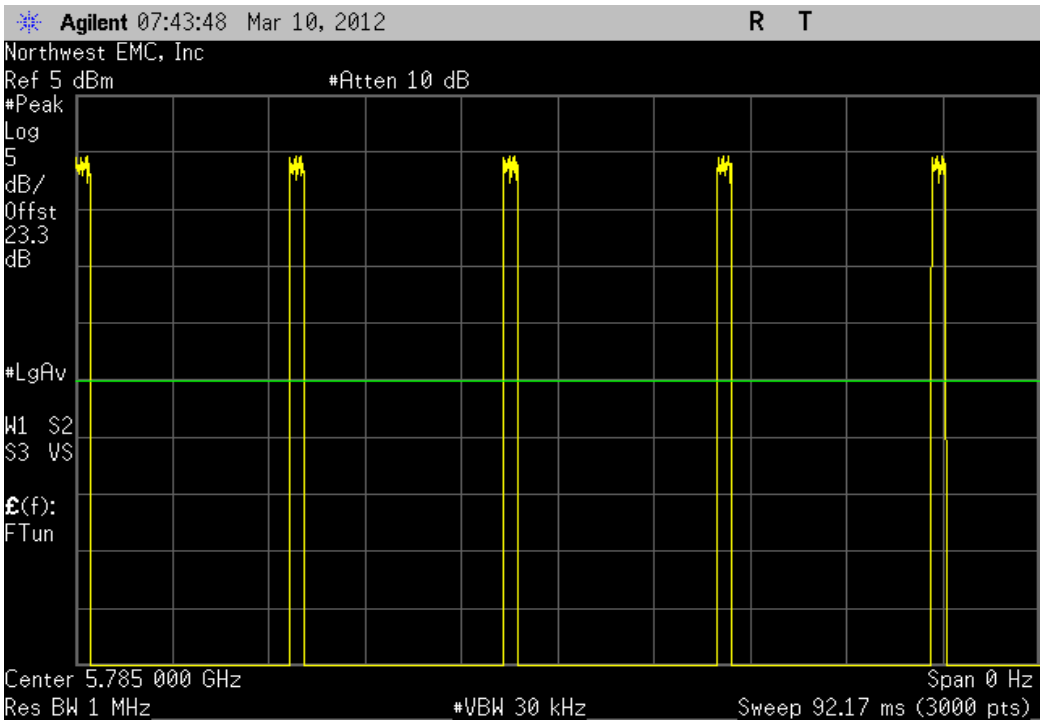


Duty Cycle

5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Mid Channel 157, 5785 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	1.38 mS	20.481 mS	1	6.70%	N/A	N/A



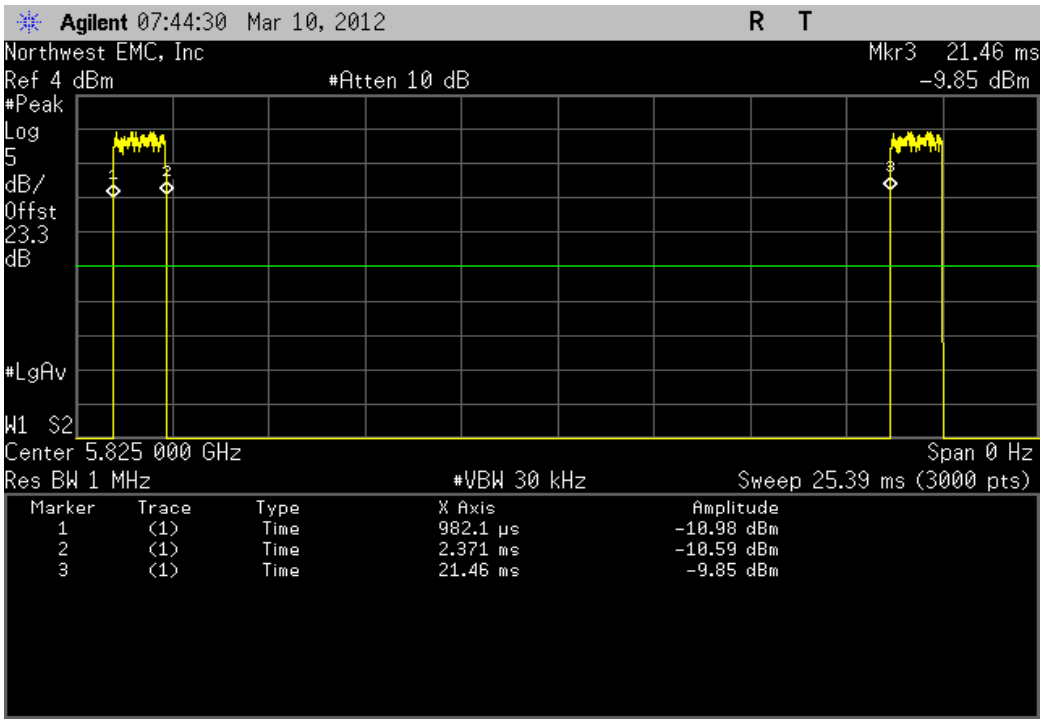
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Mid Channel 157, 5785 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A



Duty Cycle

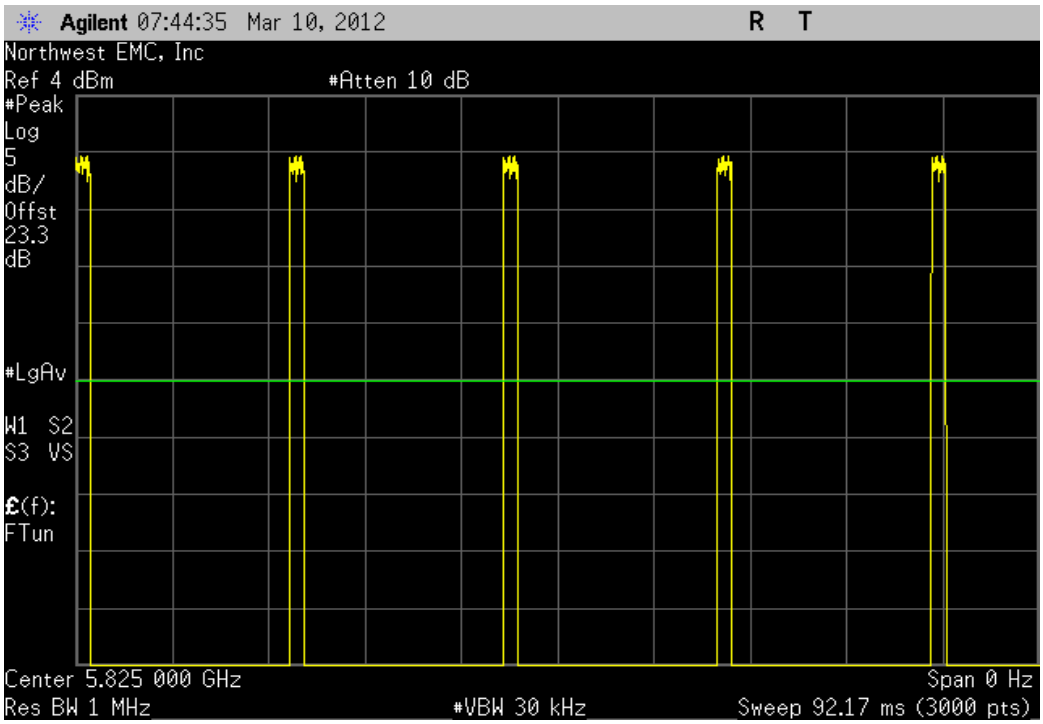
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, High Channel 165, 5825 MHz

Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
1.389 mS	20.481 mS	1	6.80%	N/A	N/A



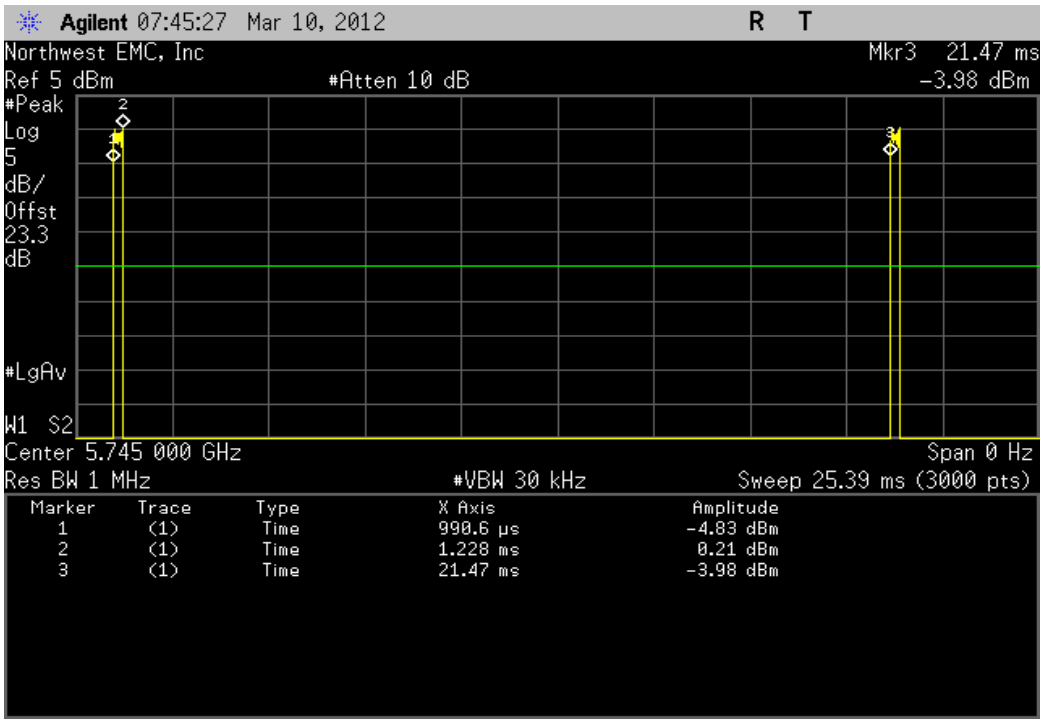
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, High Channel 165, 5825 MHz

Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
		5		N/A	N/A

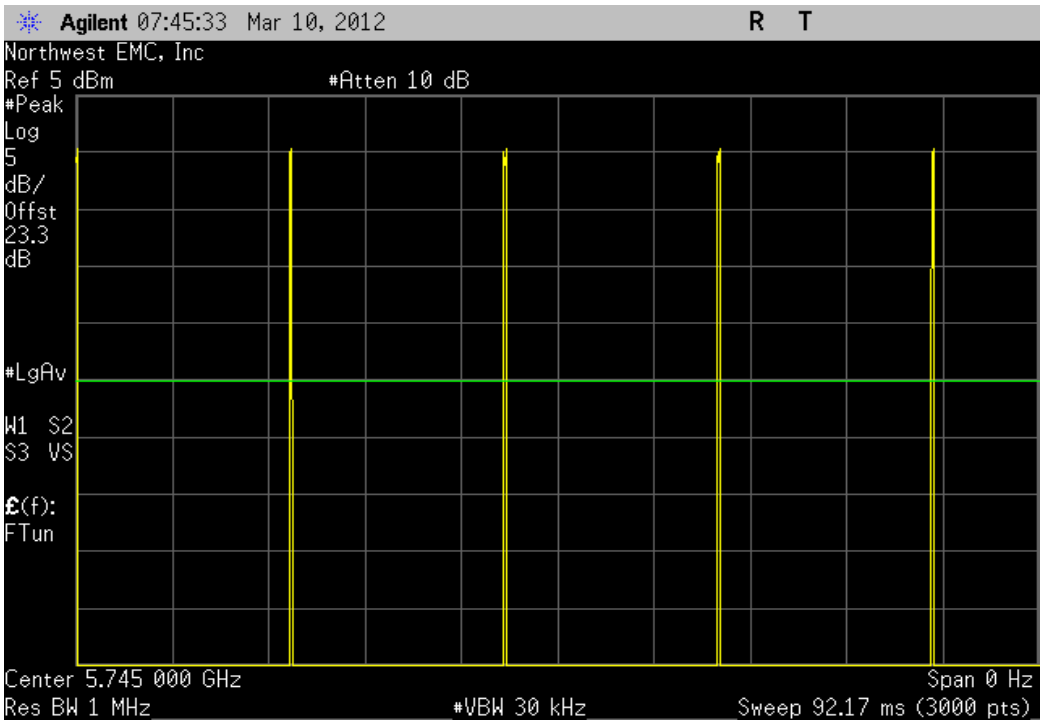


Duty Cycle

5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Low Channel 149, 5745 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	237.1 uS	20.481 mS	1	1.20%	N/A	N/A

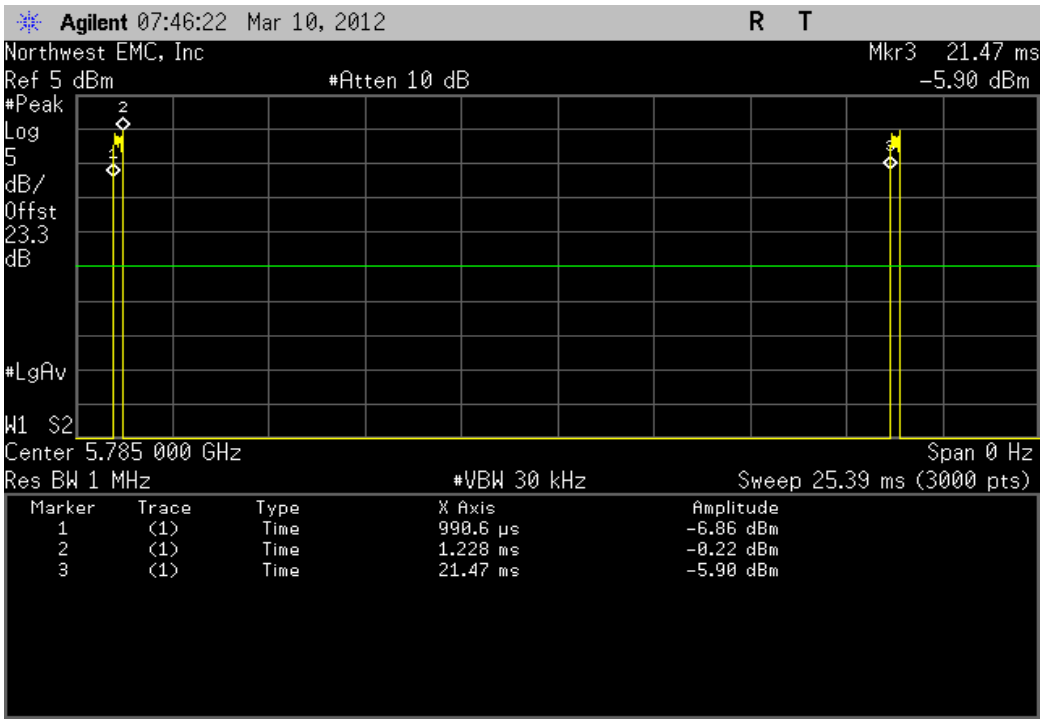


5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Low Channel 149, 5745 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

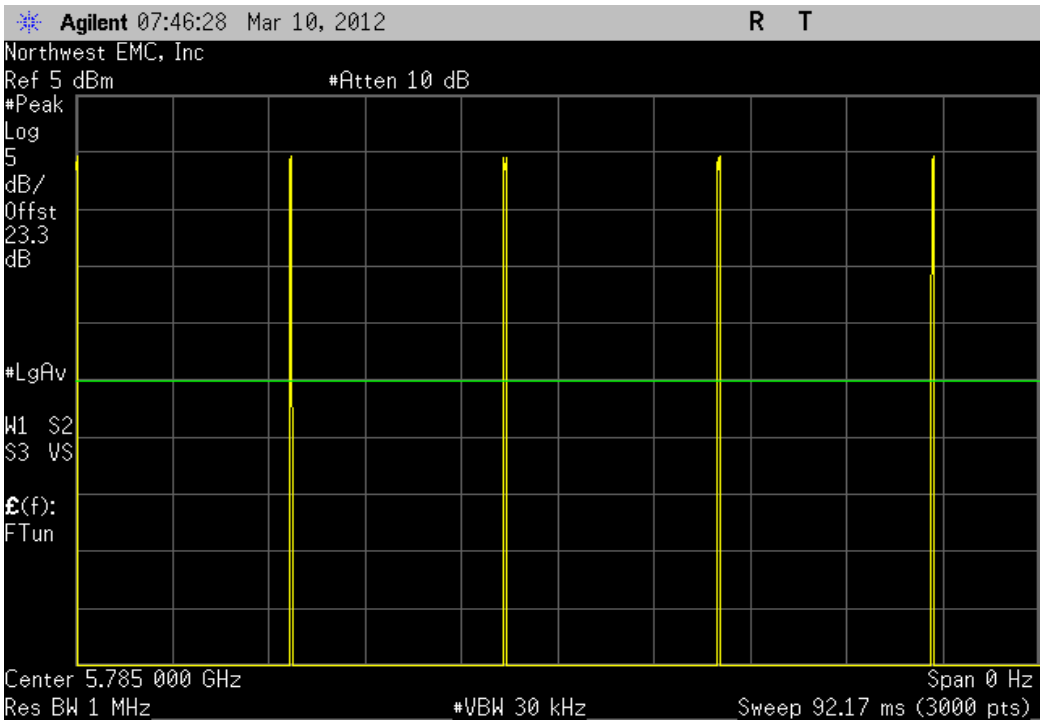


Duty Cycle

5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Mid Channel 157, 5785 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	237.1 uS	20.481 mS	1	1.20%	N/A	N/A

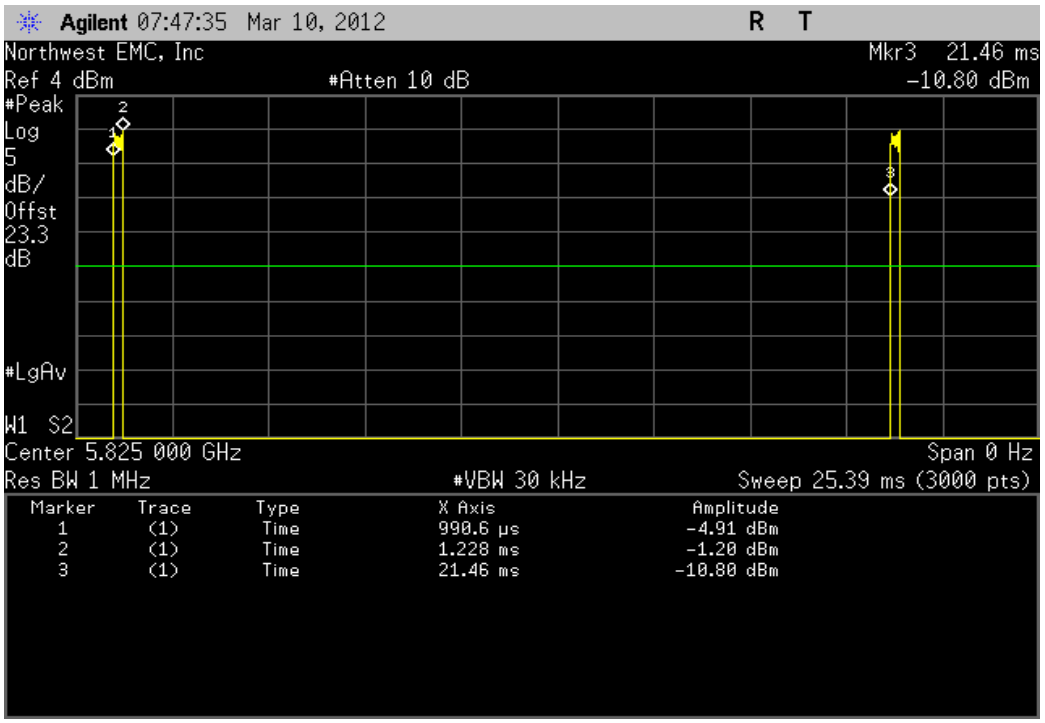


5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Mid Channel 157, 5785 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

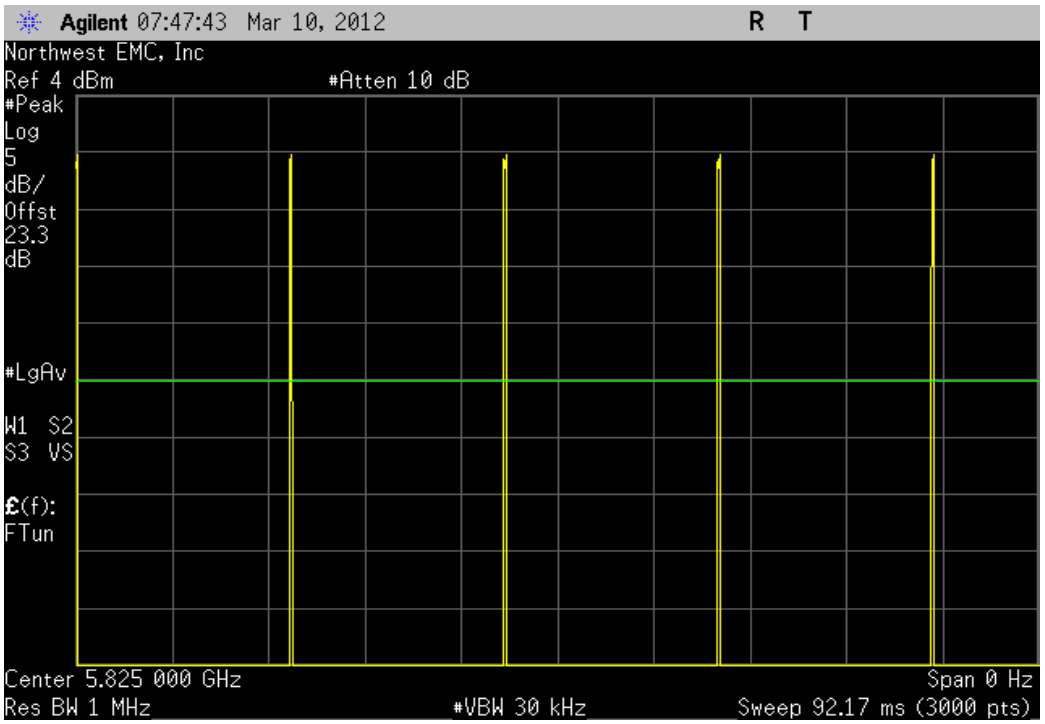


Duty Cycle

5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, High Channel 165, 5825 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	237.1 uS	20.472 mS	1	1.20%	N/A	N/A

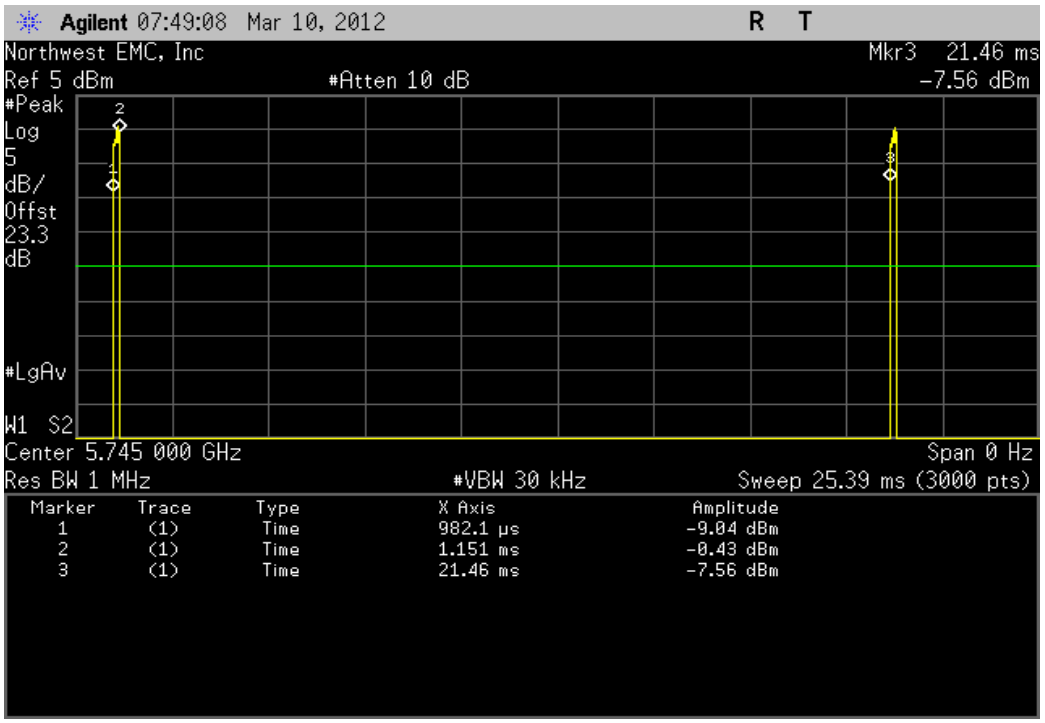


5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, High Channel 165, 5825 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

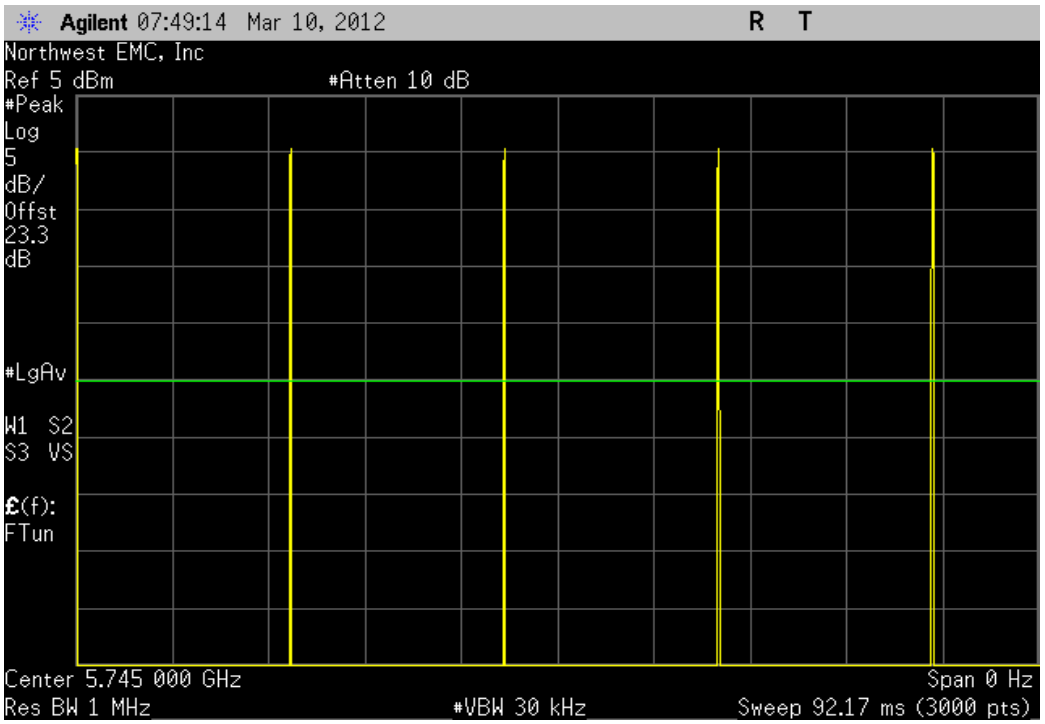


Duty Cycle

5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Low Channel 149, 5745 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	169.4 uS	20.481 mS	1	0.80%	N/A	N/A

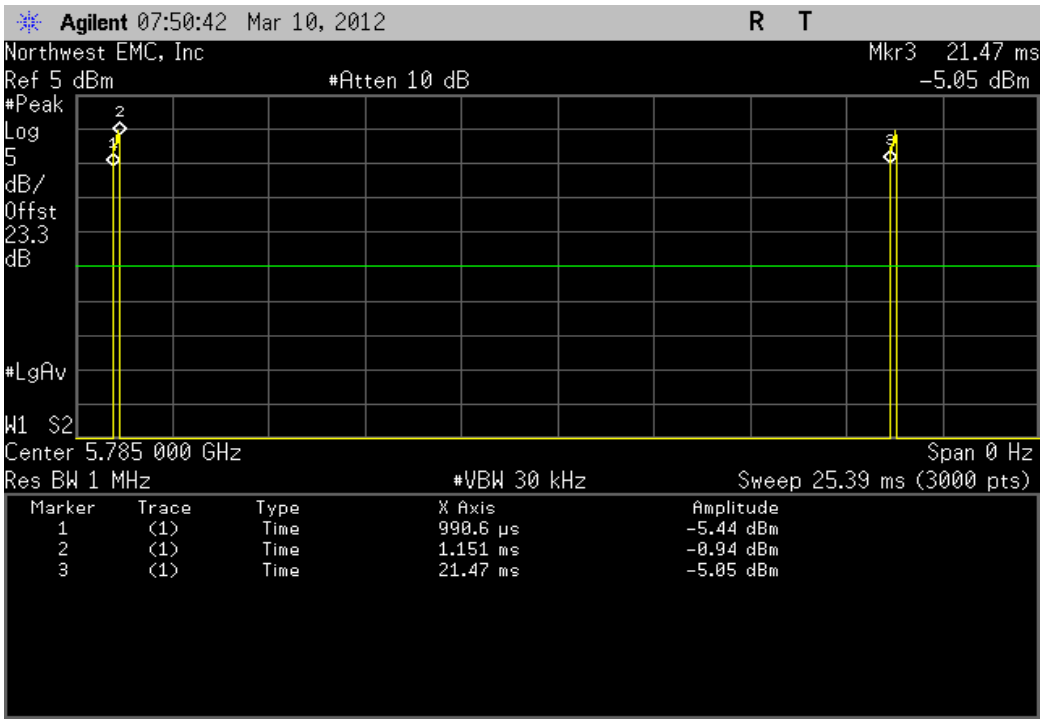


5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Low Channel 149, 5745 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

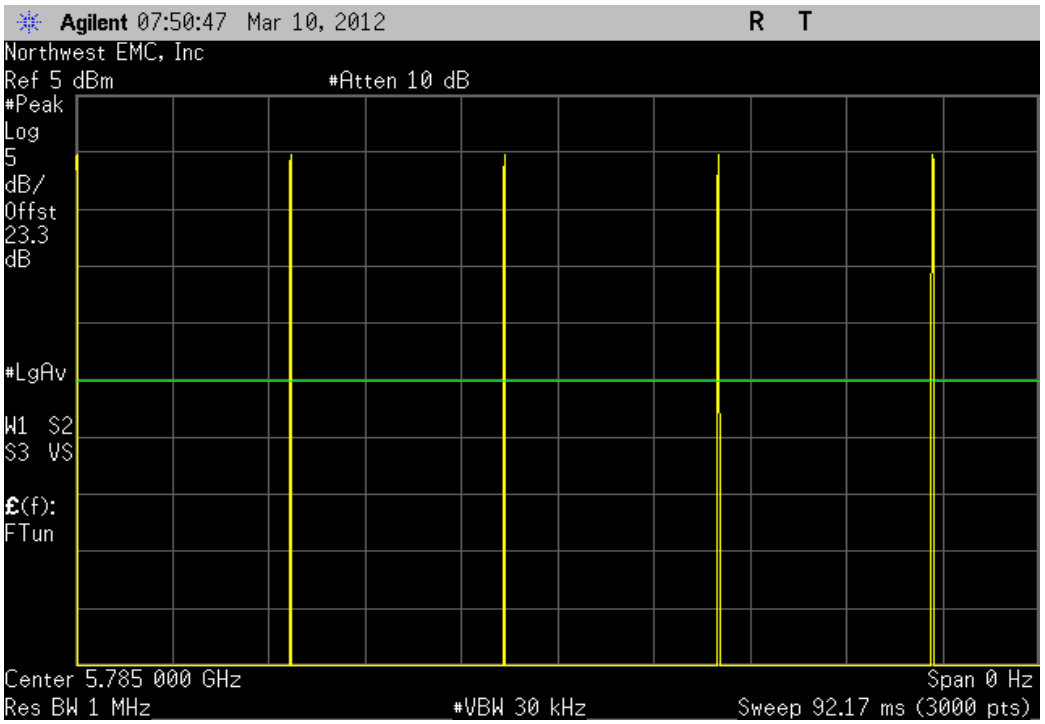


Duty Cycle

5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Mid Channel 157, 5785 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	160.9 uS	20.481 mS	1	0.80%	N/A	N/A

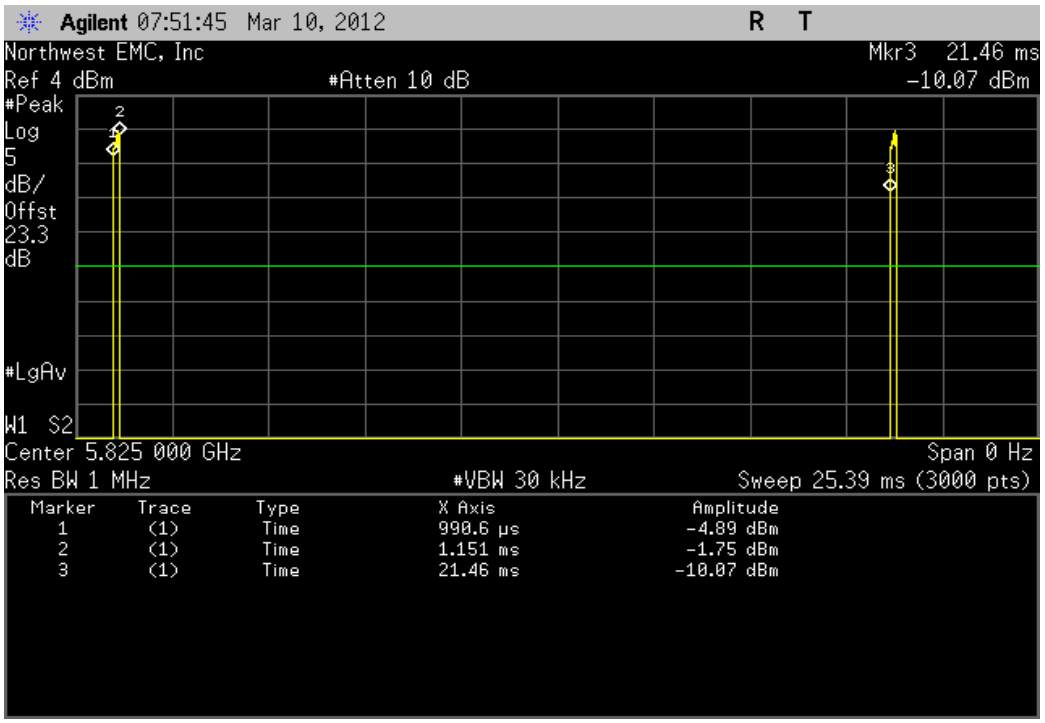


5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Mid Channel 157, 5785 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A

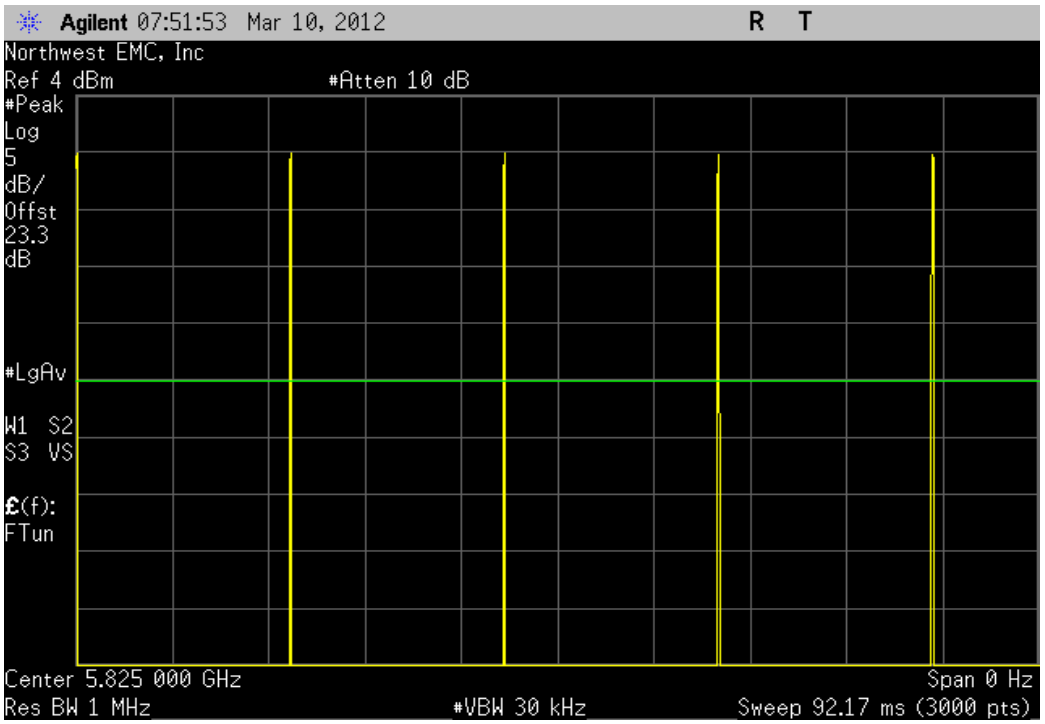


Duty Cycle

5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, High Channel 165, 5825 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	160.9 uS	20.472 mS	1	0.80%	N/A	N/A



5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, High Channel 165, 5825 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
			5		N/A	N/A



Occupied Bandwidth

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator SMA - 20dB, 40 GHz	Fairview Microwave	SA4014-20	AQI	10/12/2011	12
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Signal Generator	Agilent	N5183A	TIA	1/27/2012	12
Spectrum Analyzer	Agilent	E4446A	AAT	3/2/2012	12

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The occupied bandwidth was measured with the EUT set to low, medium, and high transmit frequencies in the ISM band. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the required data rates available in 802.11.

Occupied Bandwidth

EUT:	Sigma Pumps Integrated 802.11abg Module			**Work Order:**	DGII0053
Serial Number:	7.06			**Date:**	03/20/12
Customer:	Digi International			**Temperature:**	22.78°C
Attendees:	None			**Humidity:**	55%
Project:	None			**Barometric Pres.:**	1007.8
Tested by:	Johnathan Lee	**Power:**	110VAC/60Hz	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2012	ANSI C63.10:2009

COMMENTS

Added second harmonic filter on 5GHz path (footprint exists on board for this filter). Duty Cycle was measured at 100% operation. Channel 149, 157, 165: Power level 50. Channels 1, 6, 11 at 1 Mbps, 11 Mbps and Channel 6 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 60. Channel 1 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 45. Channel 11 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 50.

DEVIATIONS FROM TEST STANDARD

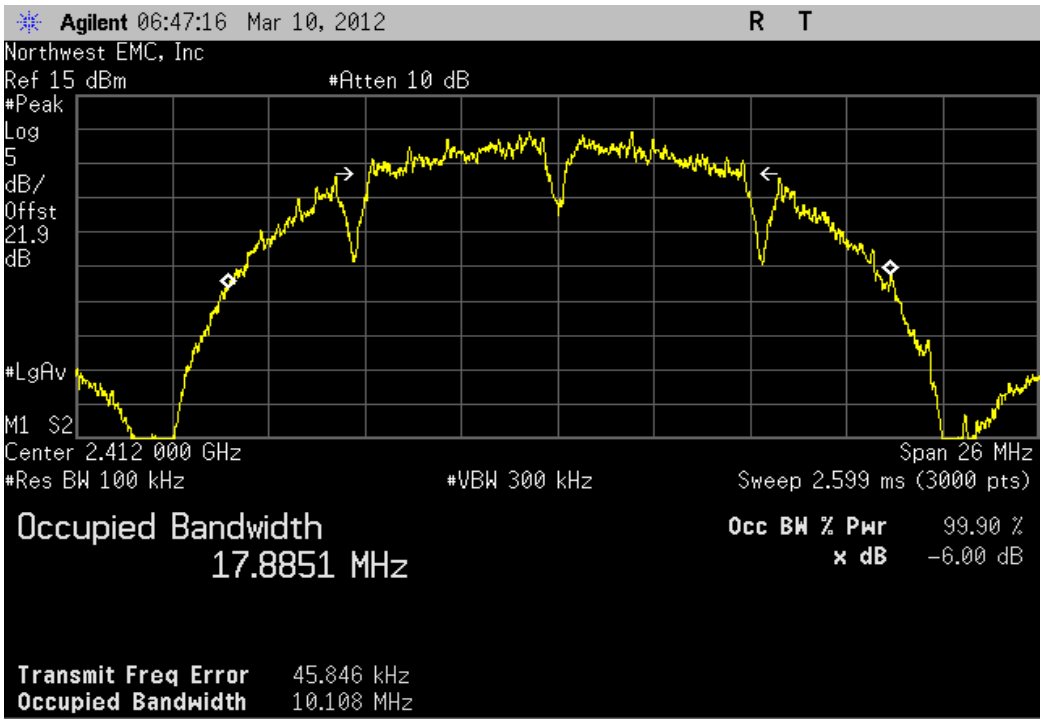
None

Configuration #	2	Signature	Trevor Bulls

		Value	Limit	Result
2400 MHz - 2483.5 MHz Band				
	802.11(b) 1 Mbps			
	Low Channel 1, 2412 MHz	10.108 MHz	> 500 kHz	Pass
	Mid Channel 6, 2437 MHz	10.02 MHz	> 500 kHz	Pass
	High Channel 11, 2462 MHz	9.189 MHz	> 500 kHz	Pass
	802.11(b) 11 Mbps			
	Low Channel 1, 2412 MHz	10.369 MHz	> 500 kHz	Pass
	Mid Channel 6, 2437 MHz	10.222 MHz	> 500 kHz	Pass
	High Channel 11, 2462 MHz	9.926 MHz	> 500 kHz	Pass
	802.11(g) 6 Mbps			
	Low Channel 1, 2412 MHz	16.539 MHz	> 500 kHz	Pass
	Mid Channel 6, 2437 MHz	16.54 MHz	> 500 kHz	Pass
	High Channel 11, 2462 MHz	16.552 MHz	> 500 kHz	Pass
	802.11(g) 36 Mbps			
	Low Channel 1, 2412 MHz	16.506 MHz	> 500 kHz	Pass
	Mid Channel 6, 2437 MHz	16.521 MHz	> 500 kHz	Pass
	High Channel 11, 2462 MHz	16.526 MHz	> 500 kHz	Pass
	802.11(g) 54 Mbps			
	Low Channel 1, 2412 MHz	16.53 MHz	> 500 kHz	Pass
	Mid Channel 6, 2437 MHz	16.509 MHz	> 500 kHz	Pass
	High Channel 11, 2462 MHz	16.502 MHz	> 500 kHz	Pass
5725 MHz - 5850 MHz Band				
	802.11(a) 6 Mbps			
	Low Channel 149, 5745 MHz	16.537 MHz	> 500 kHz	Pass
	Mid Channel 157, 5785 MHz	16.543 MHz	> 500 kHz	Pass
	High Channel 165, 5825 MHz	16.524 MHz	> 500 kHz	Pass
	802.11(a) 36 Mbps			
	Low Channel 149, 5745 MHz	16.525 MHz	> 500 kHz	Pass
	Mid Channel 157, 5785 MHz	16.515 MHz	> 500 kHz	Pass
	High Channel 165, 5825 MHz	16.498 MHz	> 500 kHz	Pass
	802.11(a) 54 Mbps			
	Low Channel 149, 5745 MHz	16.705 MHz	> 500 kHz	Pass
	Mid Channel 157, 5785 MHz	16.482 MHz	> 500 kHz	Pass
	High Channel 165, 5825 MHz	16.481 MHz	> 500 kHz	Pass

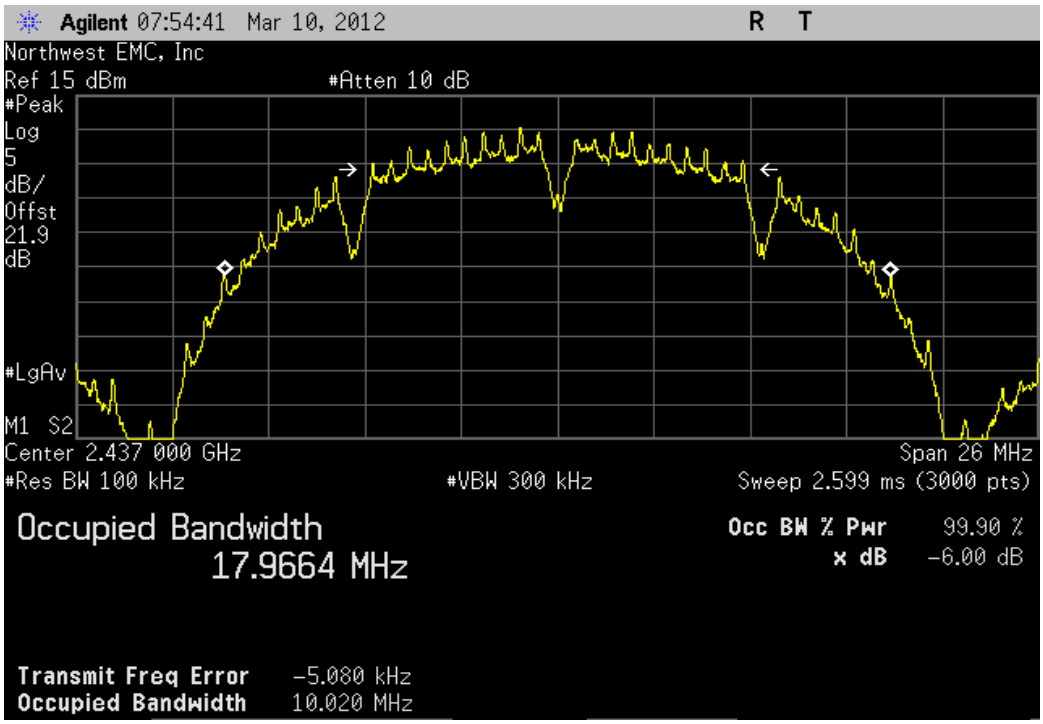
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz

				Value	Limit	Result
				10.108 MHz	> 500 kHz	Pass



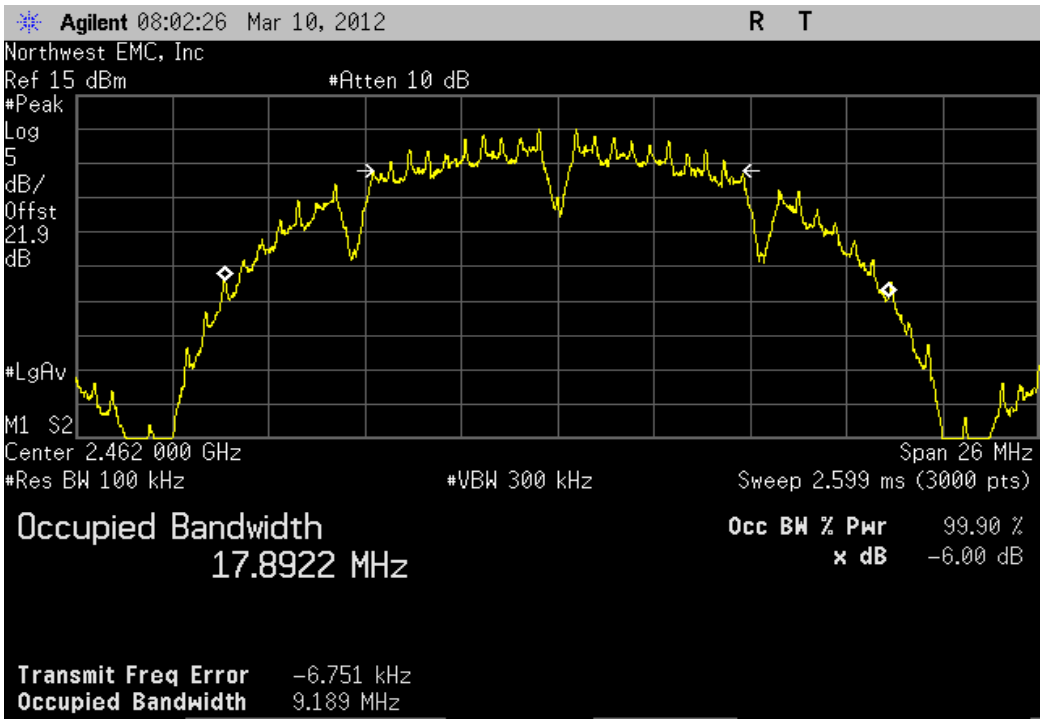
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz

				Value	Limit	Result
				10.02 MHz	> 500 kHz	Pass



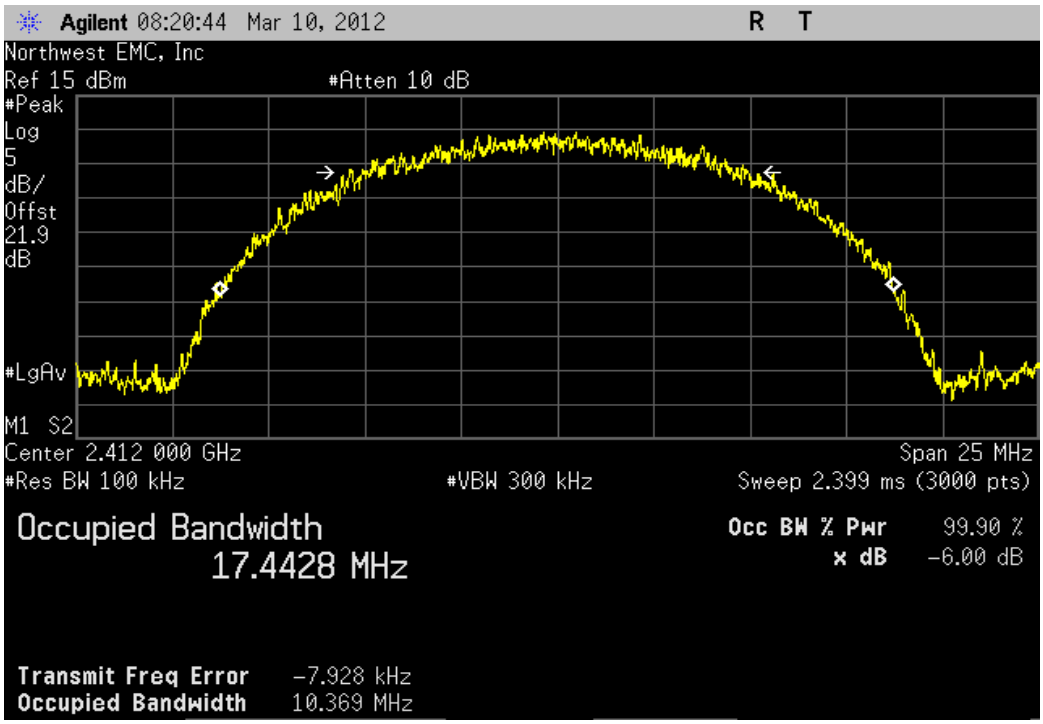
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz

				Value	Limit	Result
				9.189 MHz	> 500 kHz	Pass



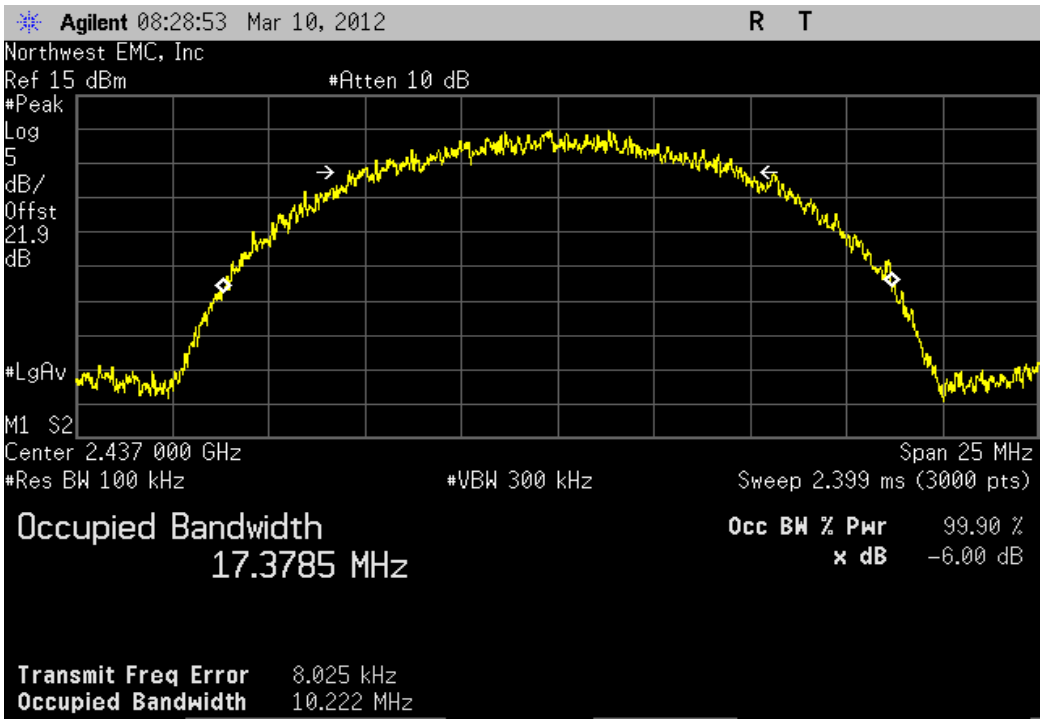
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz

				Value	Limit	Result
				10.369 MHz	> 500 kHz	Pass



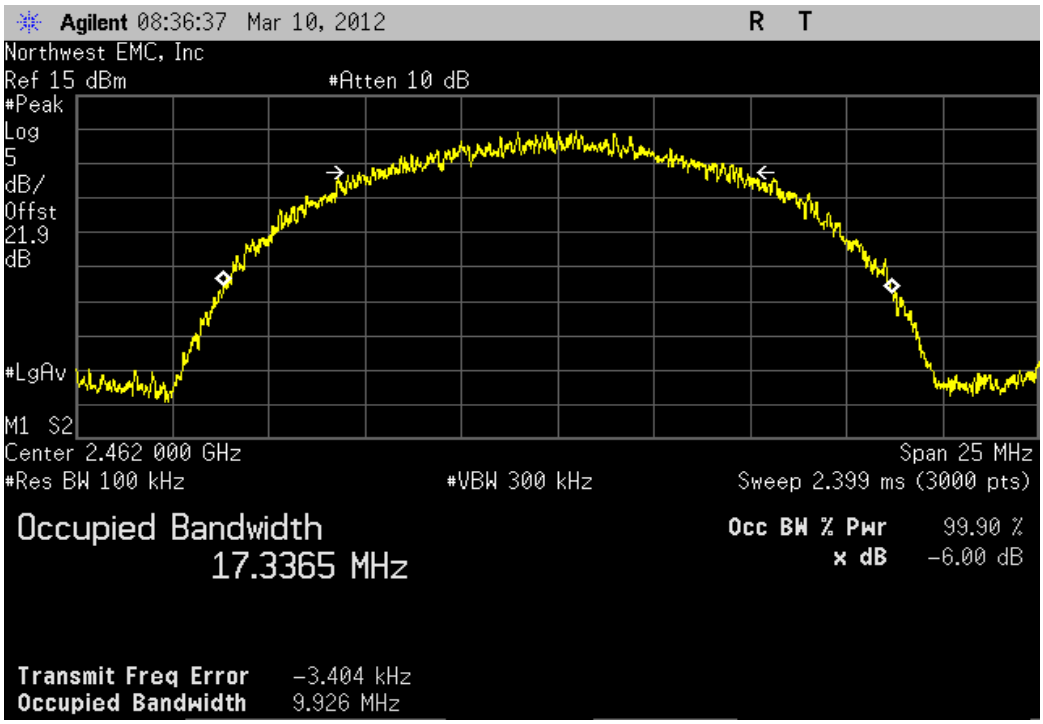
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz

				Value	Limit	Result
				10.222 MHz	> 500 kHz	Pass



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz

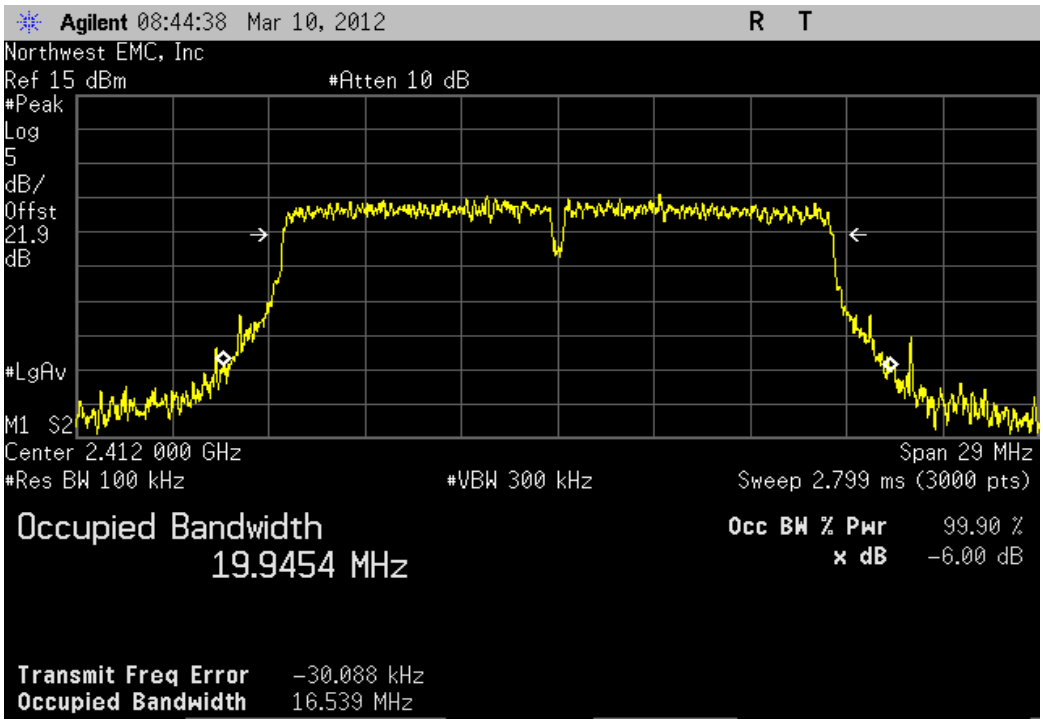
				Value	Limit	Result
				9.926 MHz	> 500 kHz	Pass



Occupied Bandwidth

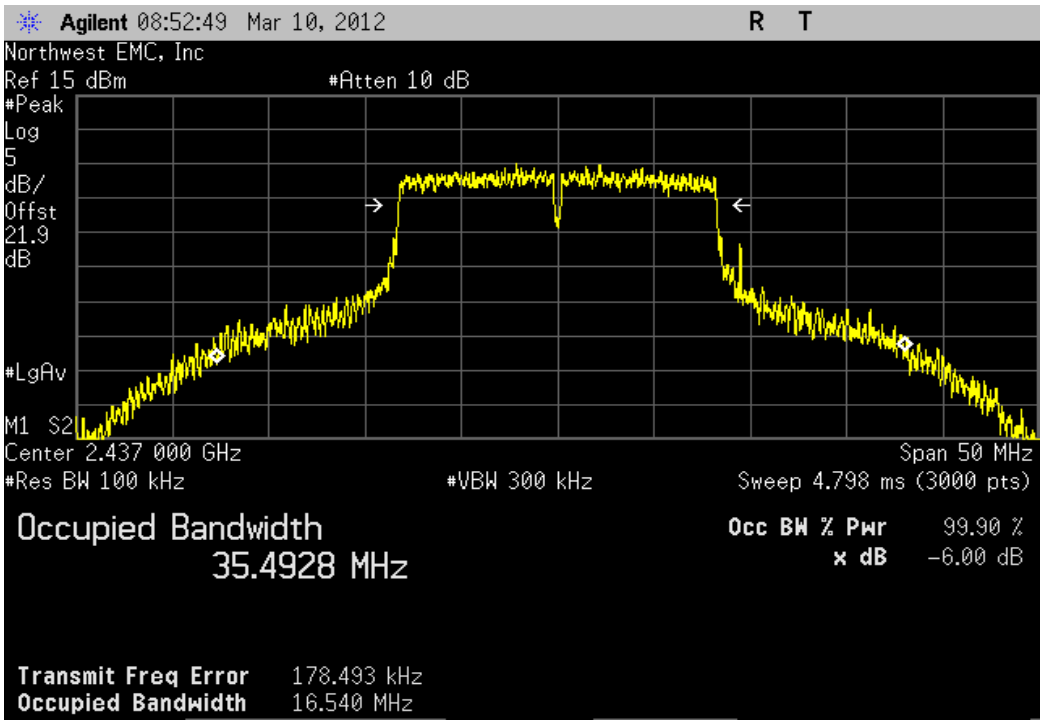
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz

				Value	Limit	Result
				16.539 MHz	> 500 kHz	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz

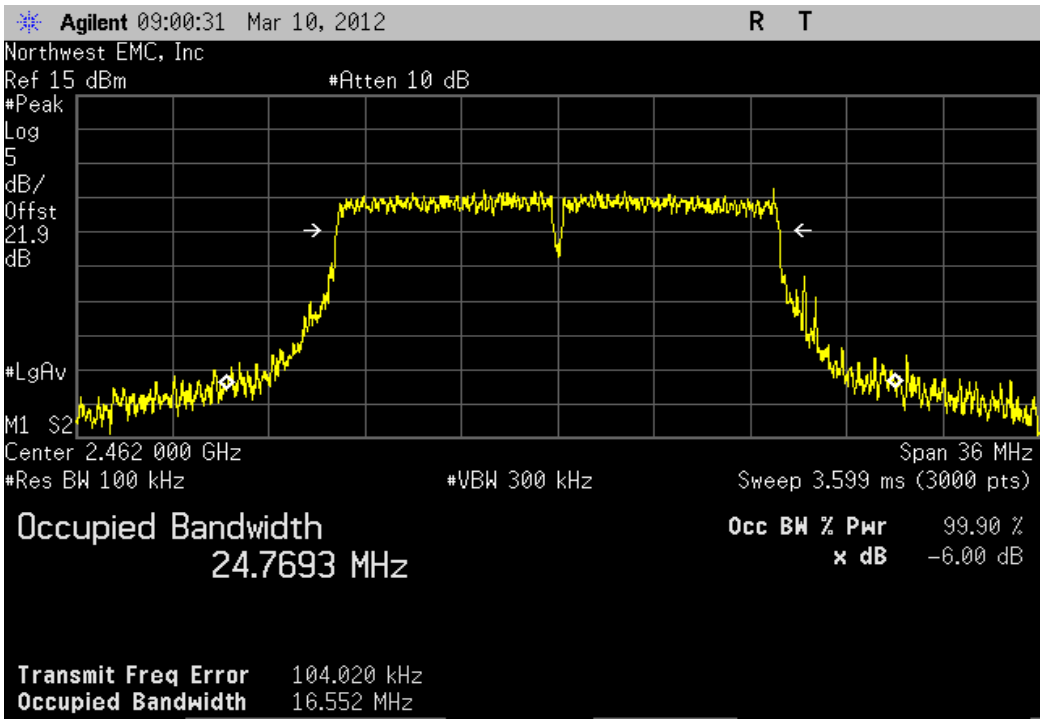
				Value	Limit	Result
				16.54 MHz	> 500 kHz	Pass



Occupied Bandwidth

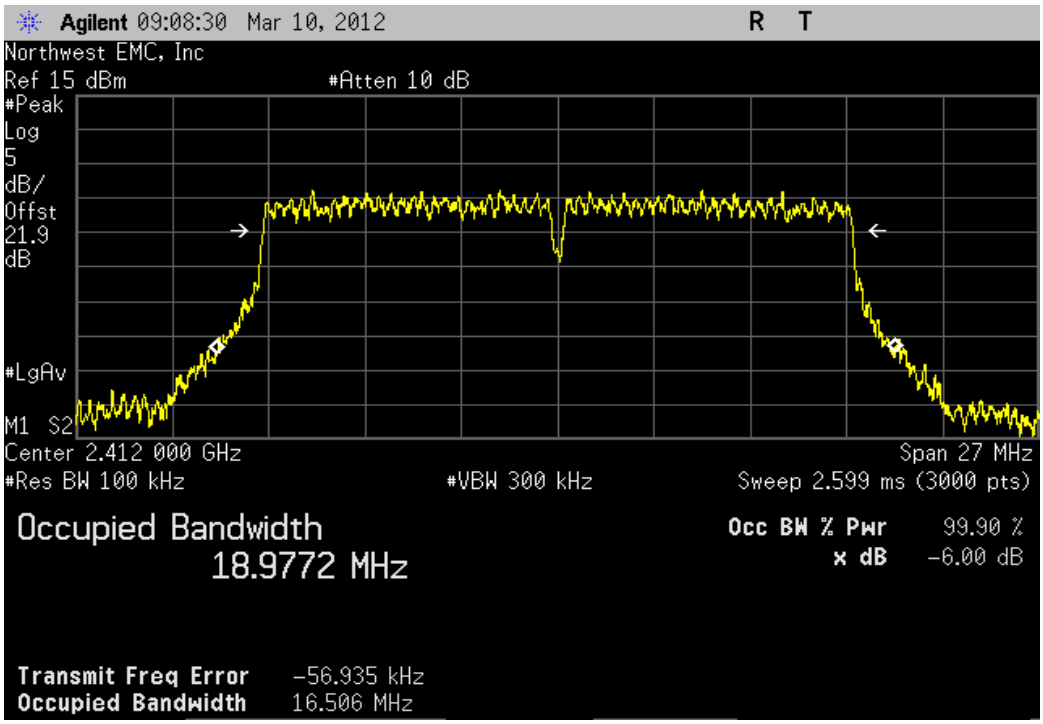
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz

				Value	Limit	Result
				16.552 MHz	> 500 kHz	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz

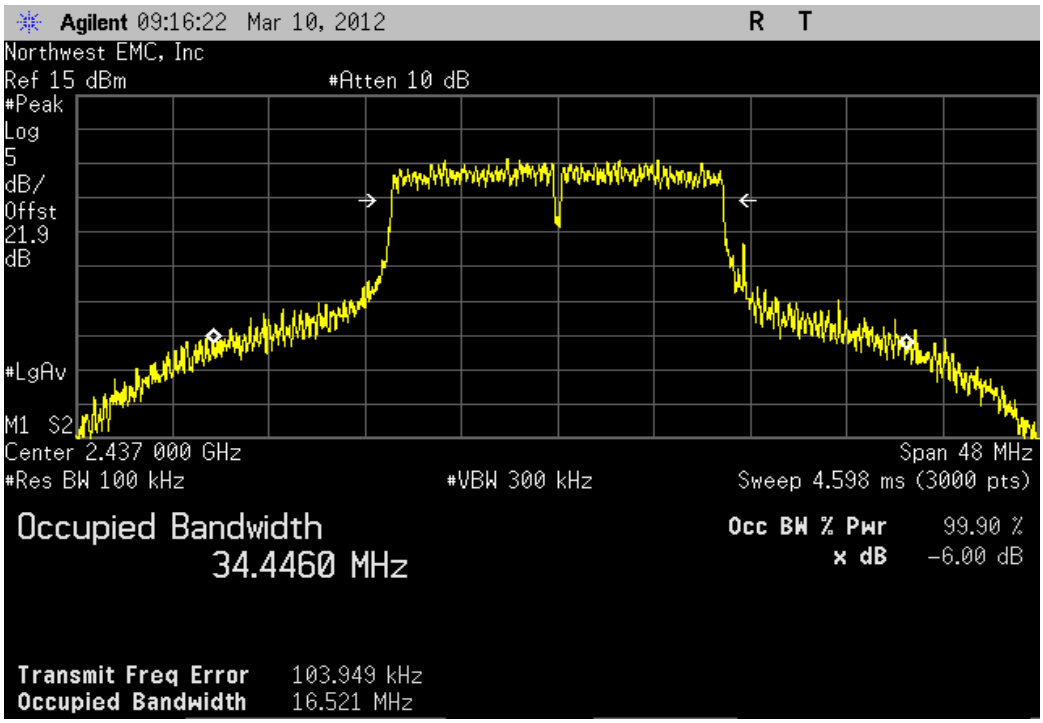
				Value	Limit	Result
				16.506 MHz	> 500 kHz	Pass



Occupied Bandwidth

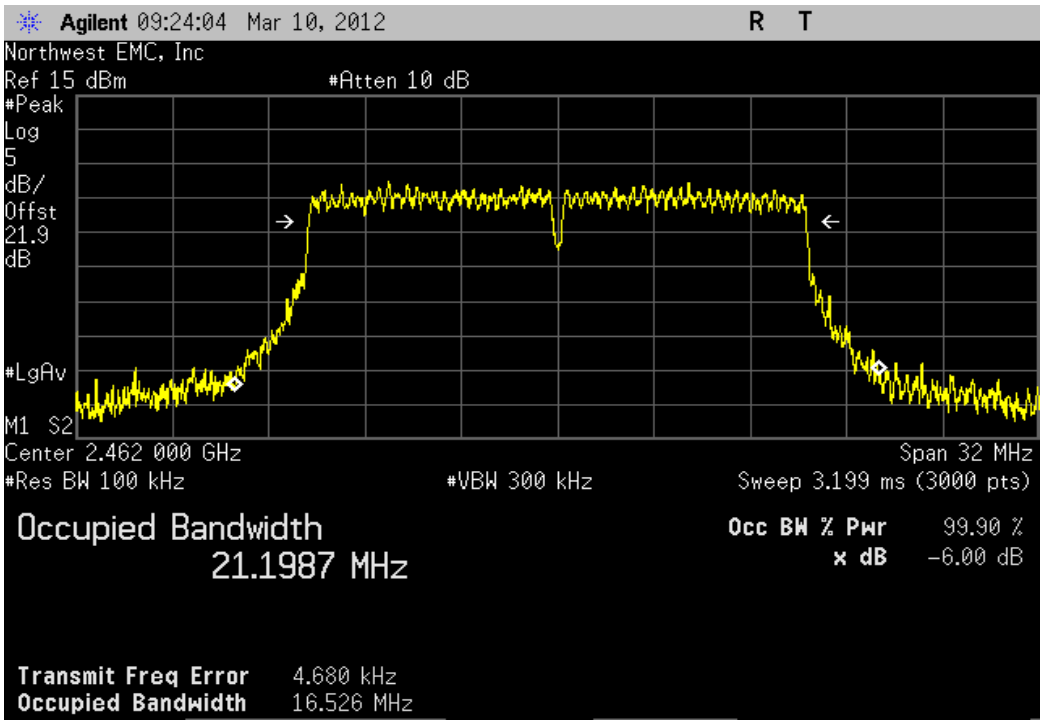
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz

				Value	Limit	Result
				16.521 MHz	> 500 kHz	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz

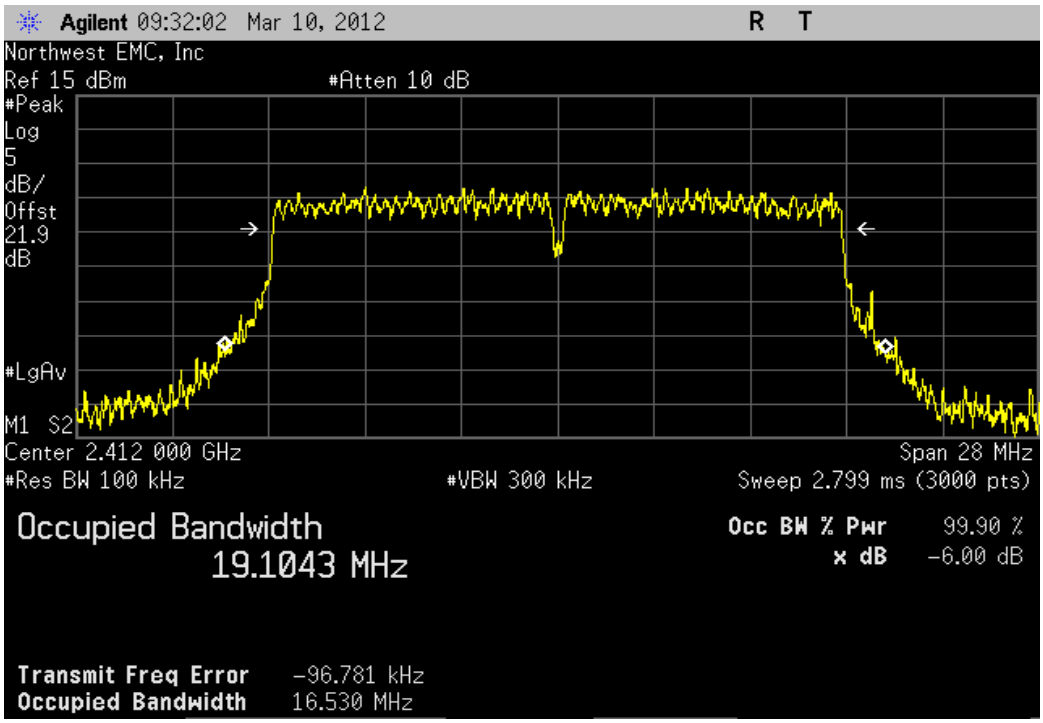
				Value	Limit	Result
				16.526 MHz	> 500 kHz	Pass



Occupied Bandwidth

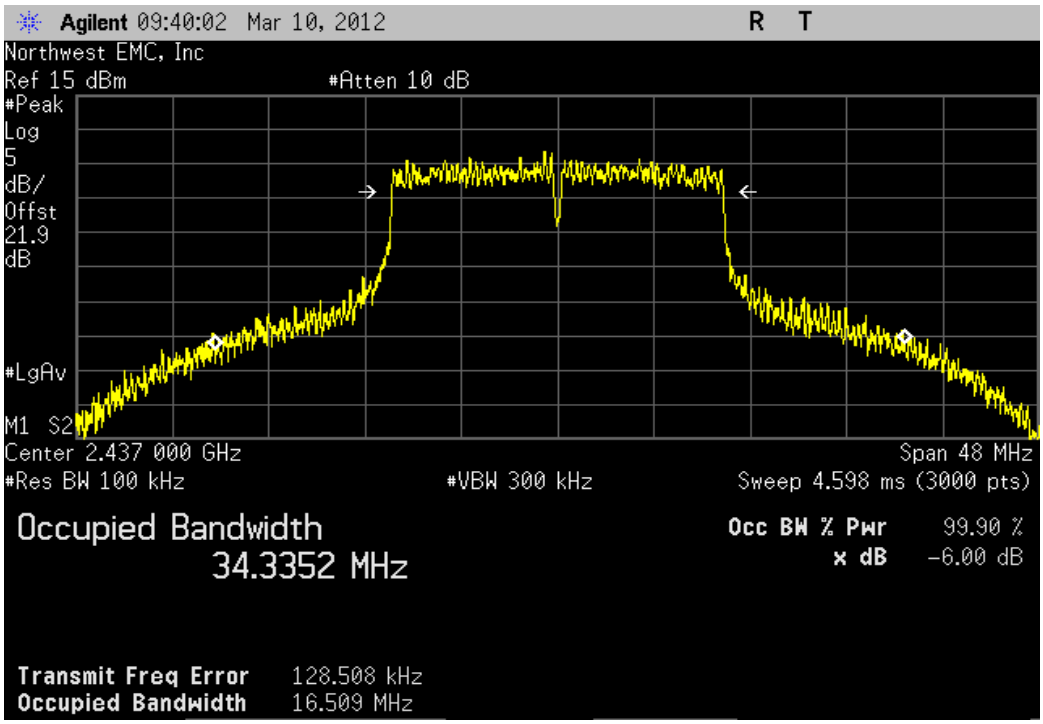
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz

				Value	Limit	Result
				16.53 MHz	> 500 kHz	Pass



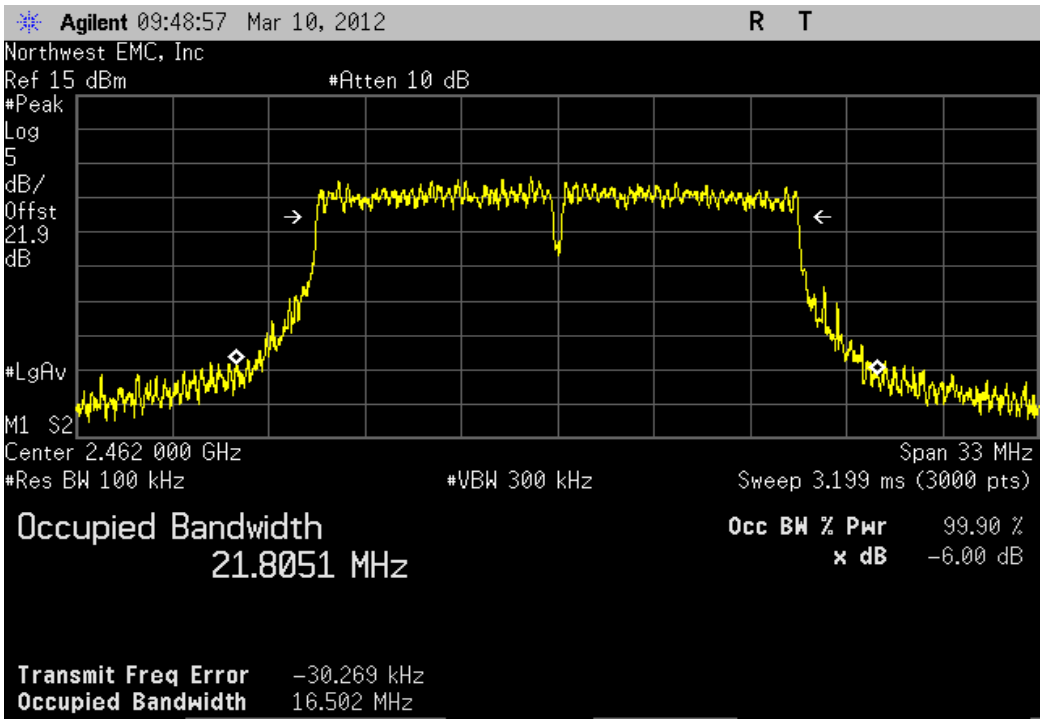
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz

				Value	Limit	Result
				16.509 MHz	> 500 kHz	Pass



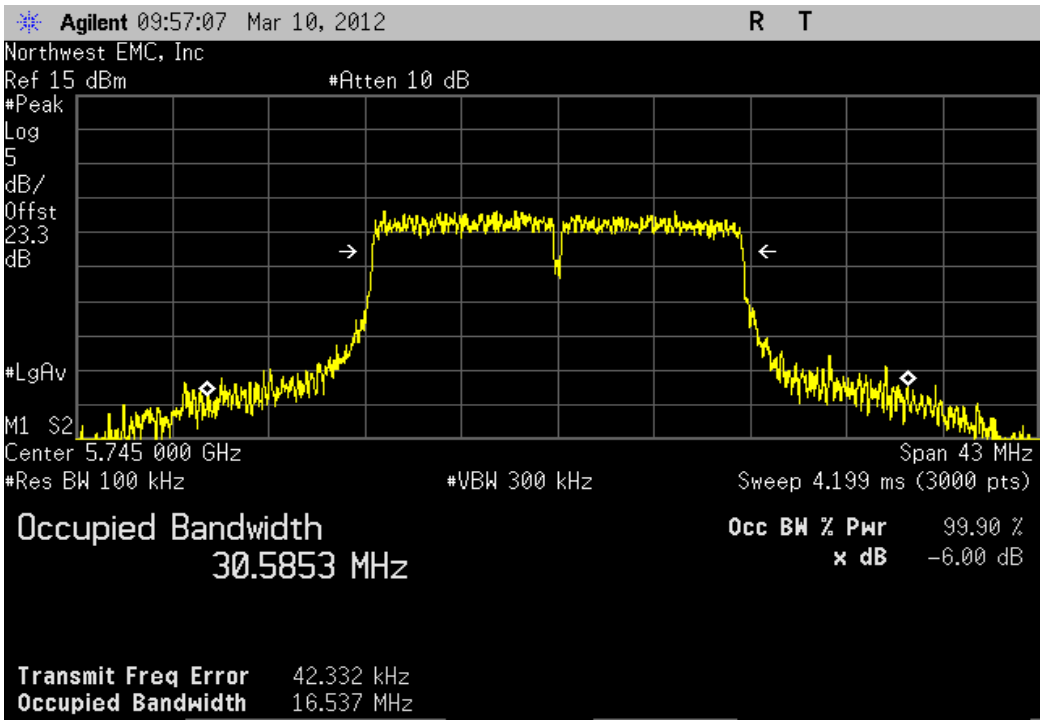
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz

				Value	Limit	Result
				16.502 MHz	> 500 kHz	Pass



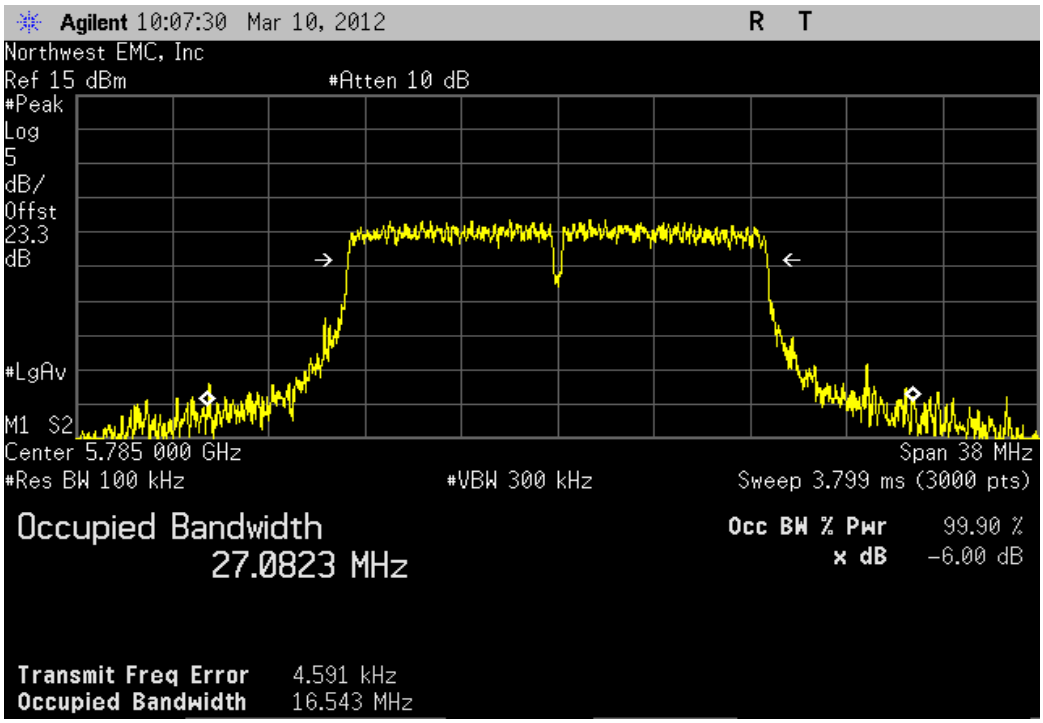
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Low Channel 149, 5745 MHz

				Value	Limit	Result
				16.537 MHz	> 500 kHz	Pass

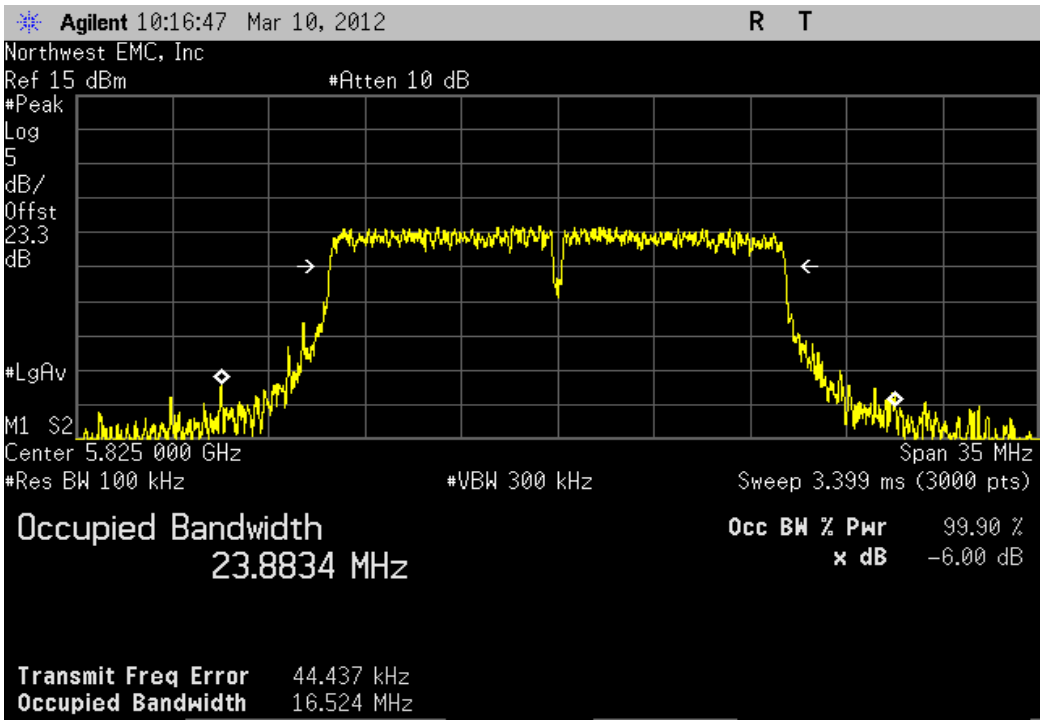


Occupied Bandwidth

5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Mid Channel 157, 5785 MHz						
				Value	Limit	Result
				16.543 MHz	> 500 kHz	Pass



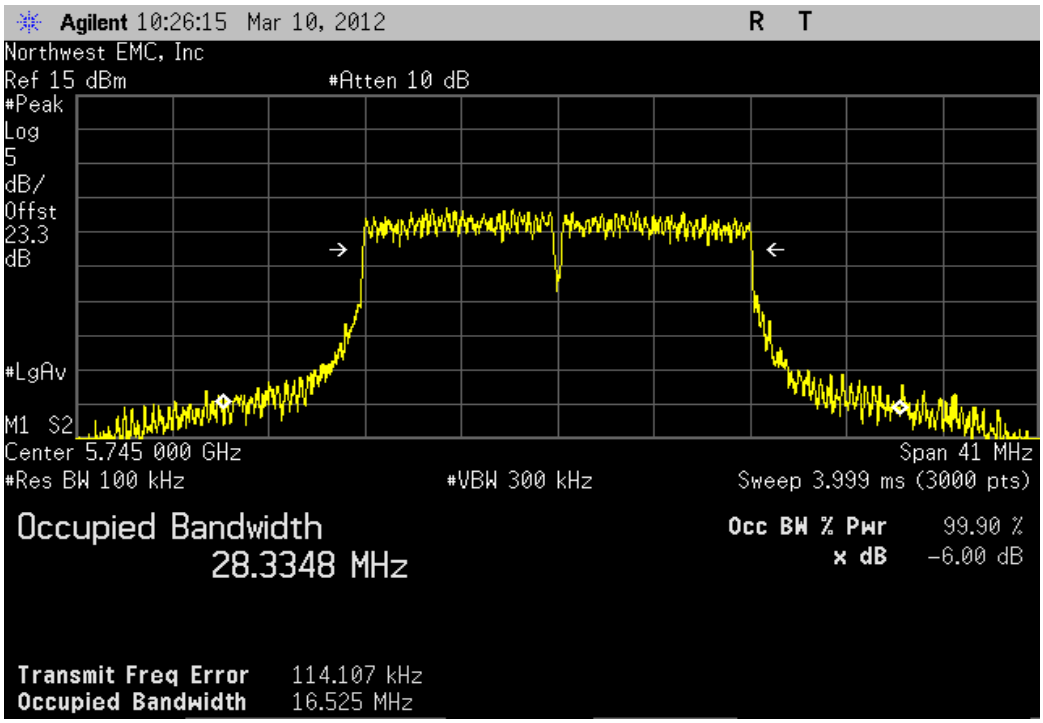
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, High Channel 165, 5825 MHz						
				Value	Limit	Result
				16.524 MHz	> 500 kHz	Pass



Occupied Bandwidth

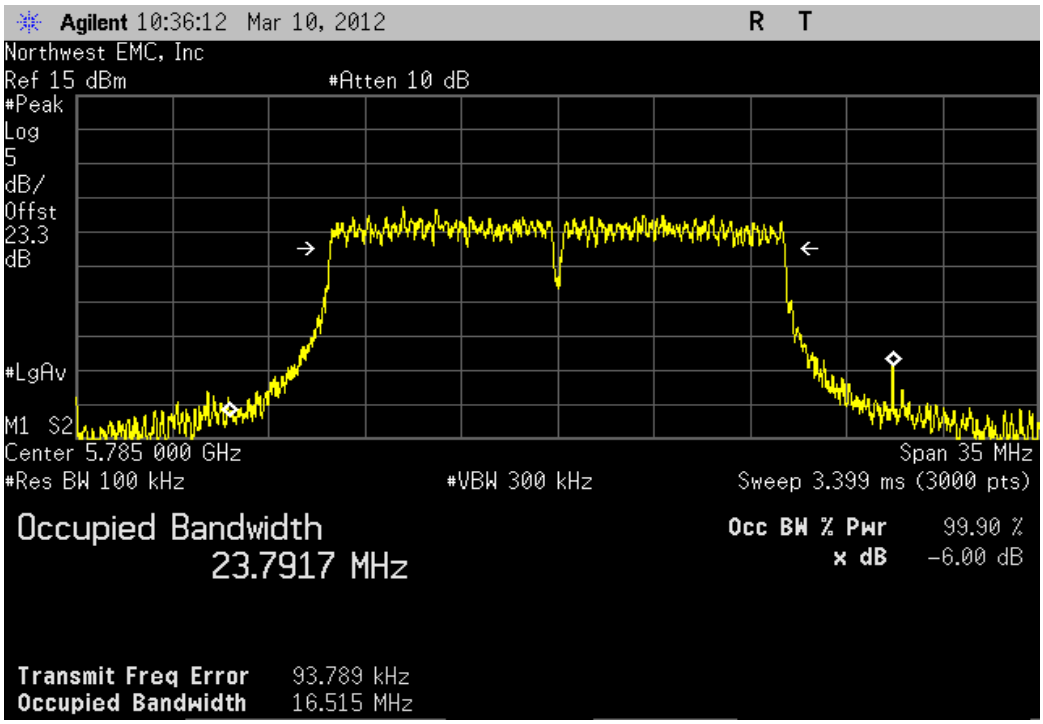
5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Low Channel 149, 5745 MHz

				Value	Limit	Result
				16.525 MHz	> 500 kHz	Pass



5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Mid Channel 157, 5785 MHz

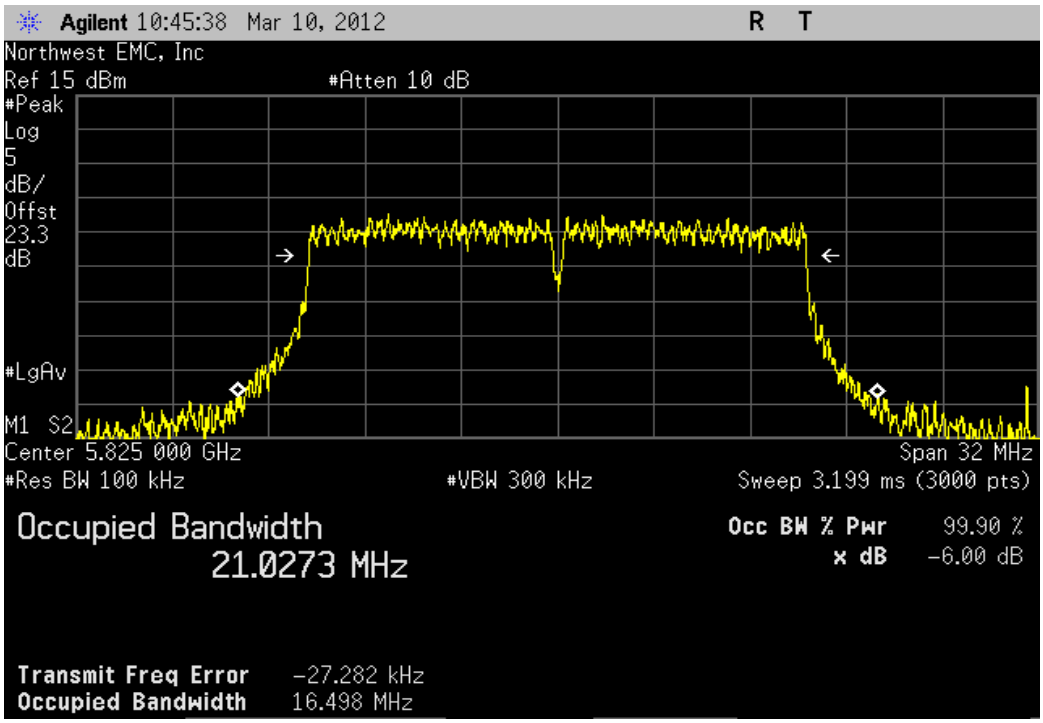
				Value	Limit	Result
				16.515 MHz	> 500 kHz	Pass



Occupied Bandwidth

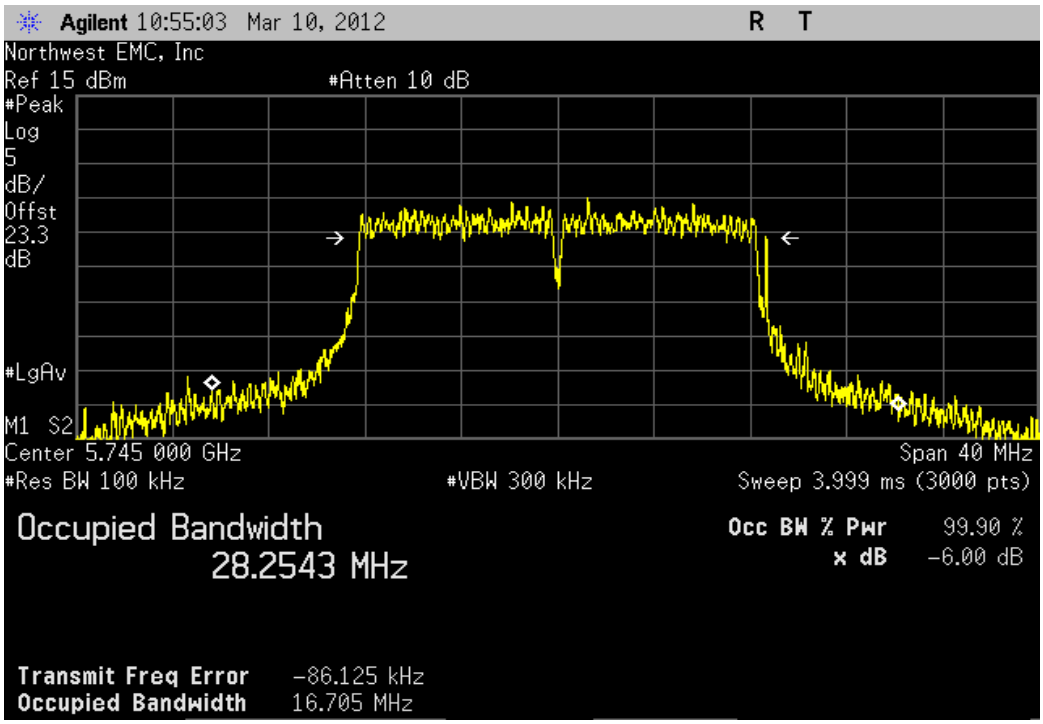
5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, High Channel 165, 5825 MHz

				Value	Limit	Result
				16.498 MHz	> 500 kHz	Pass



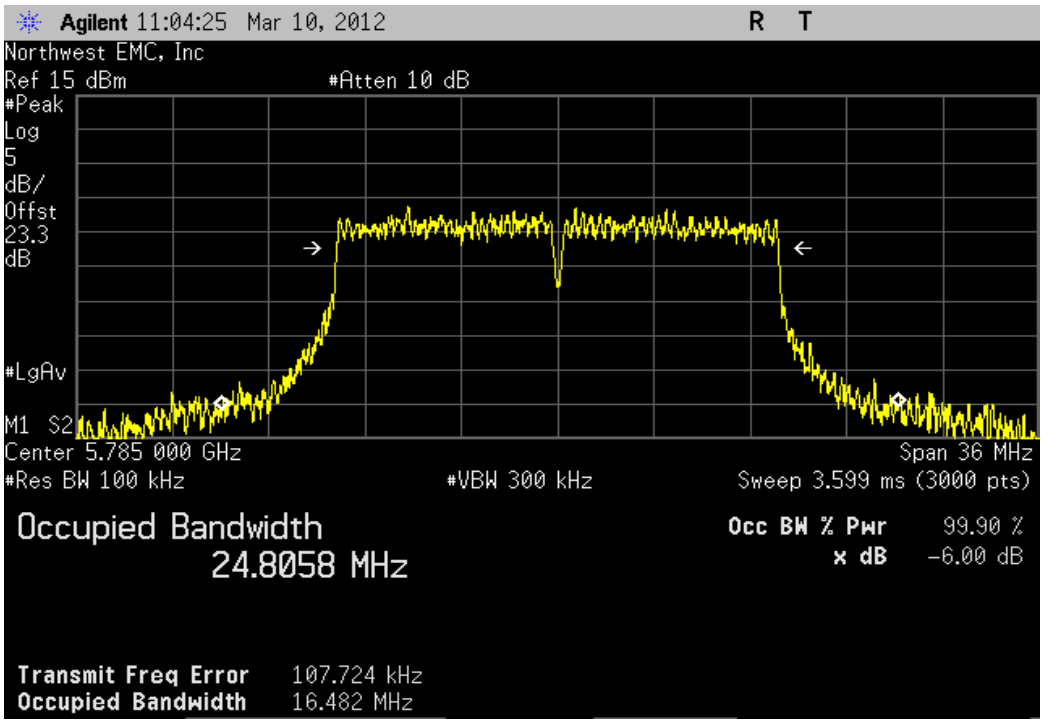
5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Low Channel 149, 5745 MHz

				Value	Limit	Result
				16.705 MHz	> 500 kHz	Pass



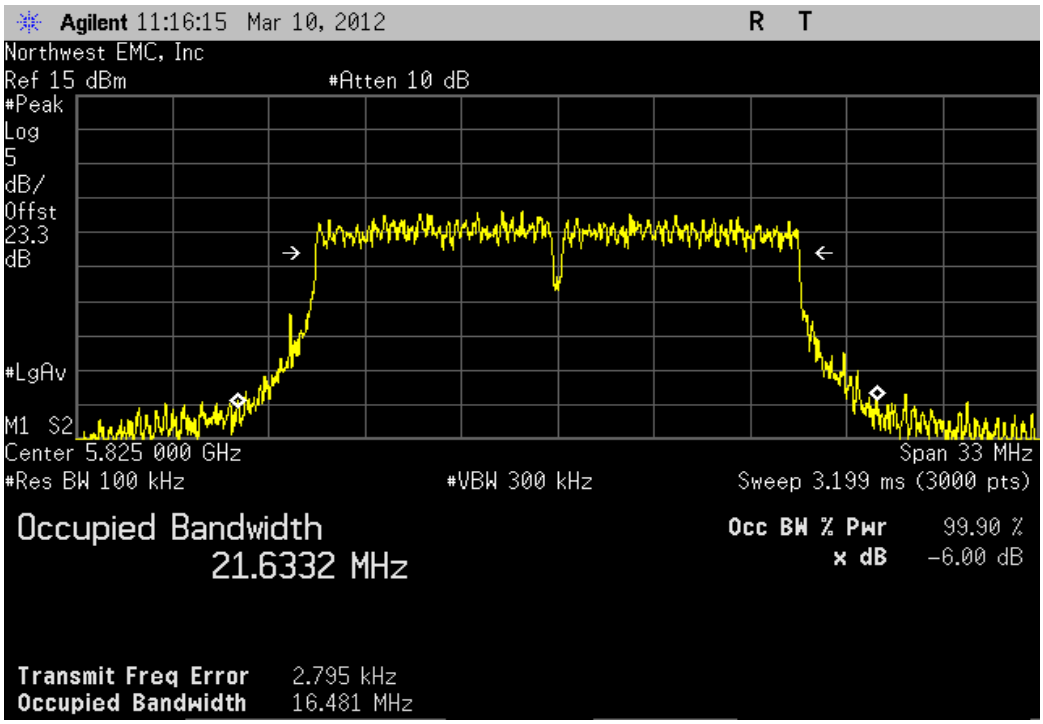
5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Mid Channel 157, 5785 MHz

				Value	Limit	Result
				16.482 MHz	> 500 kHz	Pass



5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, High Channel 165, 5825 MHz

				Value	Limit	Result
				16.481 MHz	> 500 kHz	Pass



Output Power

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Attenuator SMA - 20dB, 40 GHz	Fairview Microwave	SA4014-20	AQI	10/12/2011	12
Signal Generator	Agilent	N5183A	TIA	1/27/2012	12
Spectrum Analyzer	Agilent	E4446A	AAT	3/2/2012	12

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band, at each of the required data rates. The transmit power was set to its default maximum. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

- Prior to measuring peak transmit power; the emission bandwidth (B) was measured.
- Power was integrated across “B”, by using the channel power function of the spectrum analyzer.
- RBW = 1 MHz, VBW = 3 MHz

Output Power

EUT:	Sigma Pumps Integrated 802.11abg Module			**Work Order:**	DGII0053
Serial Number:	7.06			**Date:**	03/20/12
Customer:	Digi International			**Temperature:**	22.78°C
Attendees:	None			**Humidity:**	55%
Project:	None			**Barometric Pres.:**	1007.8
Tested by:	Johnathan Lee	**Power:**	110VAC/60Hz	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2012	ANSI C63.10:2009

COMMENTS

Added second harmonic filter on 5GHz path (footprint exists on board for this filter). Duty Cycle was measured at 100% operation. Channel 149, 157, 165: Power level 50. Channels 1, 6, 11 at 1 Mbps, 11 Mbps and Channel 6 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 60. Channel 1 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 45. Channel 11 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 50.

DEVIATIONS FROM TEST STANDARD

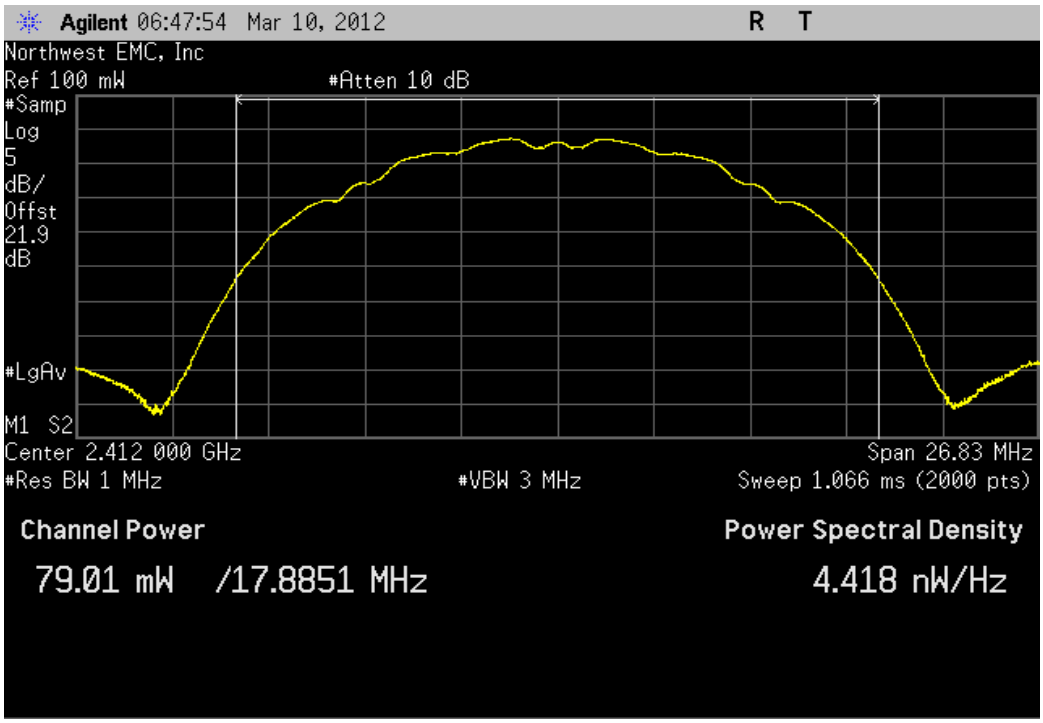
None

Configuration #	2	Signature	Trevor Bills

		Value	Limit	Result
2400 MHz - 2483.5 MHz Band				
	802.11(b) 1 Mbps			
	Low Channel 1, 2412 MHz	79.01 mW	< 1 W	Pass
	Mid Channel 6, 2437 MHz	78.331 mW	< 1 W	Pass
	High Channel 11, 2462 MHz	72.857 mW	< 1 W	Pass
	802.11(b) 11 Mbps			
	Low Channel 1, 2412 MHz	82.279 mW	< 1 W	Pass
	Mid Channel 6, 2437 MHz	79.375 mW	< 1 W	Pass
	High Channel 11, 2462 MHz	75.664 mW	< 1 W	Pass
	802.11(g) 6 Mbps			
	Low Channel 1, 2412 MHz	25.101 mW	< 1 W	Pass
	Mid Channel 6, 2437 MHz	67.716 mW	< 1 W	Pass
	High Channel 11, 2462 MHz	32.01 mW	< 1 W	Pass
	802.11(g) 36 Mbps			
	Low Channel 1, 2412 MHz	24.897 mW	< 1 W	Pass
	Mid Channel 6, 2437 MHz	67.317 mW	< 1 W	Pass
	High Channel 11, 2462 MHz	31.773 mW	< 1 W	Pass
	802.11(g) 54 Mbps			
	Low Channel 1, 2412 MHz	25.688 mW	< 1 W	Pass
	Mid Channel 6, 2437 MHz	69.17 mW	< 1 W	Pass
	High Channel 11, 2462 MHz	32.95 mW	< 1 W	Pass
5725 MHz - 5850 MHz Band				
	802.11(a) 6 Mbps			
	Low Channel 149, 5745 MHz	17.061 mW	< 1 W	Pass
	Mid Channel 157, 5785 MHz	12.954 mW	< 1 W	Pass
	High Channel 165, 5825 MHz	11.115 mW	< 1 W	Pass
	802.11(a) 36 Mbps			
	Low Channel 149, 5745 MHz	14.553 mW	< 1 W	Pass
	Mid Channel 157, 5785 MHz	12.801 mW	< 1 W	Pass
	High Channel 165, 5825 MHz	11.601 mW	< 1 W	Pass
	802.11(a) 54 Mbps			
	Low Channel 149, 5745 MHz	15.213 mW	< 1 W	Pass
	Mid Channel 157, 5785 MHz	13.362 mW	< 1 W	Pass
	High Channel 165, 5825 MHz	11.395 mW	< 1 W	Pass

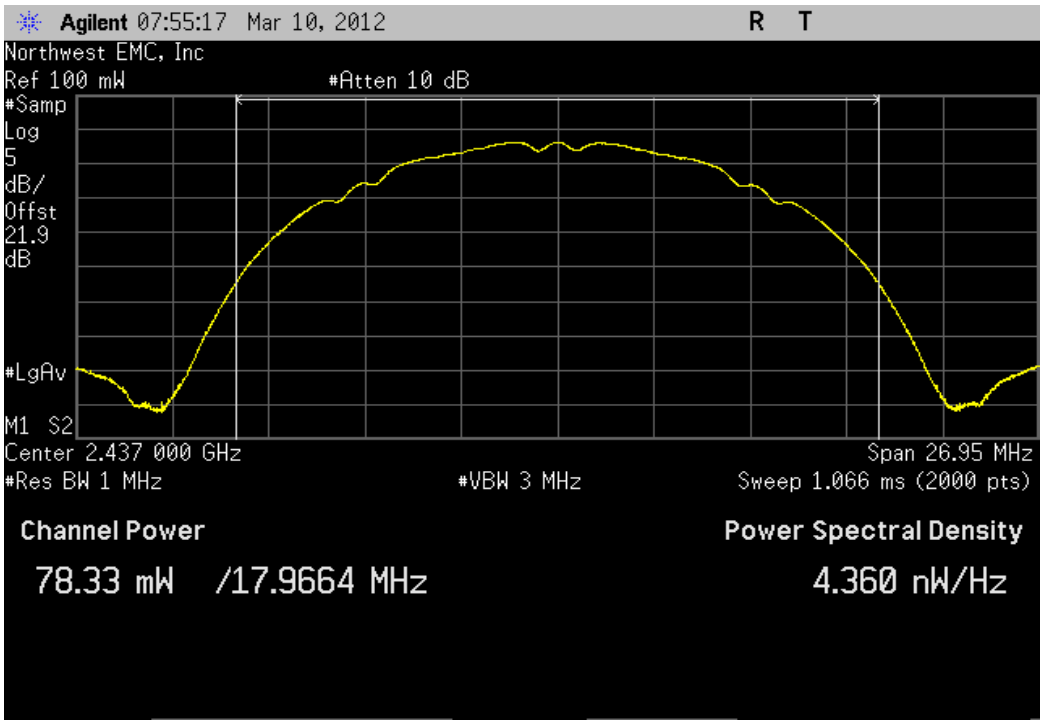
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz

				Value	Limit	Result
				79.01 mW	< 1 W	Pass



2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz

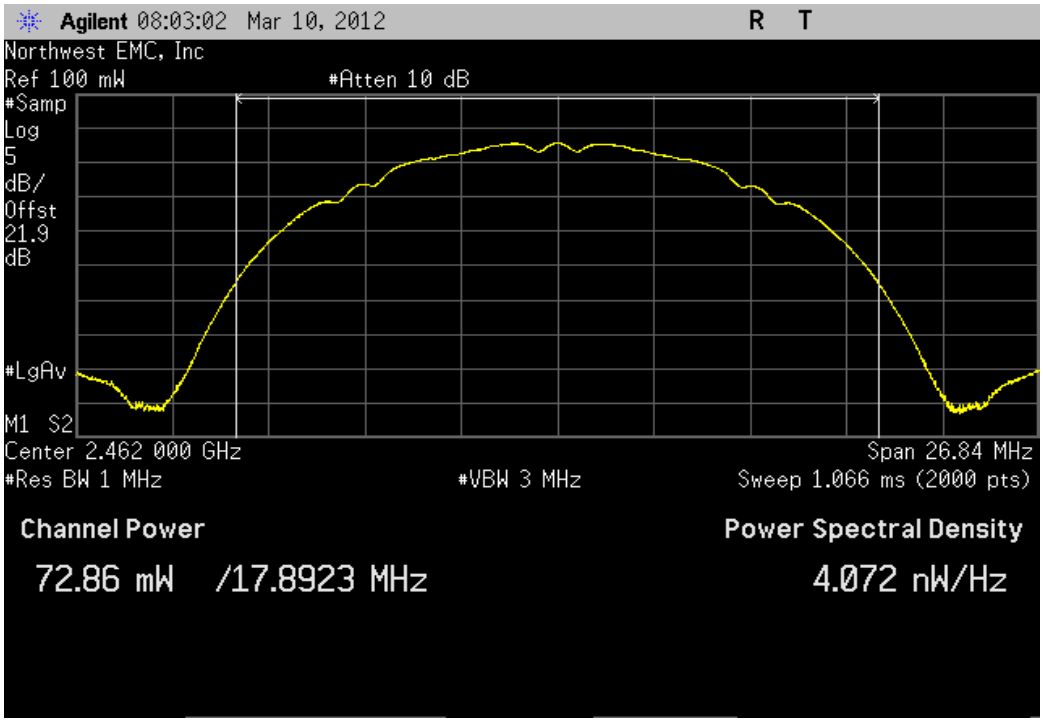
				Value	Limit	Result
				78.331 mW	< 1 W	Pass



Output Power

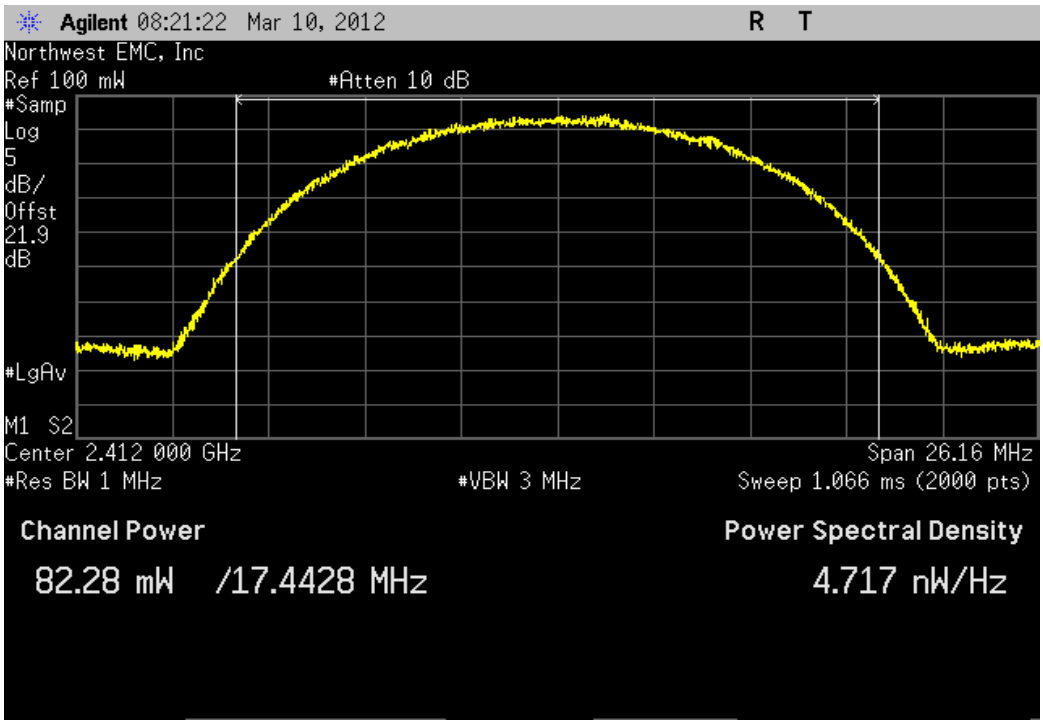
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz

				Value	Limit	Result
				72.857 mW	< 1 W	Pass



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz

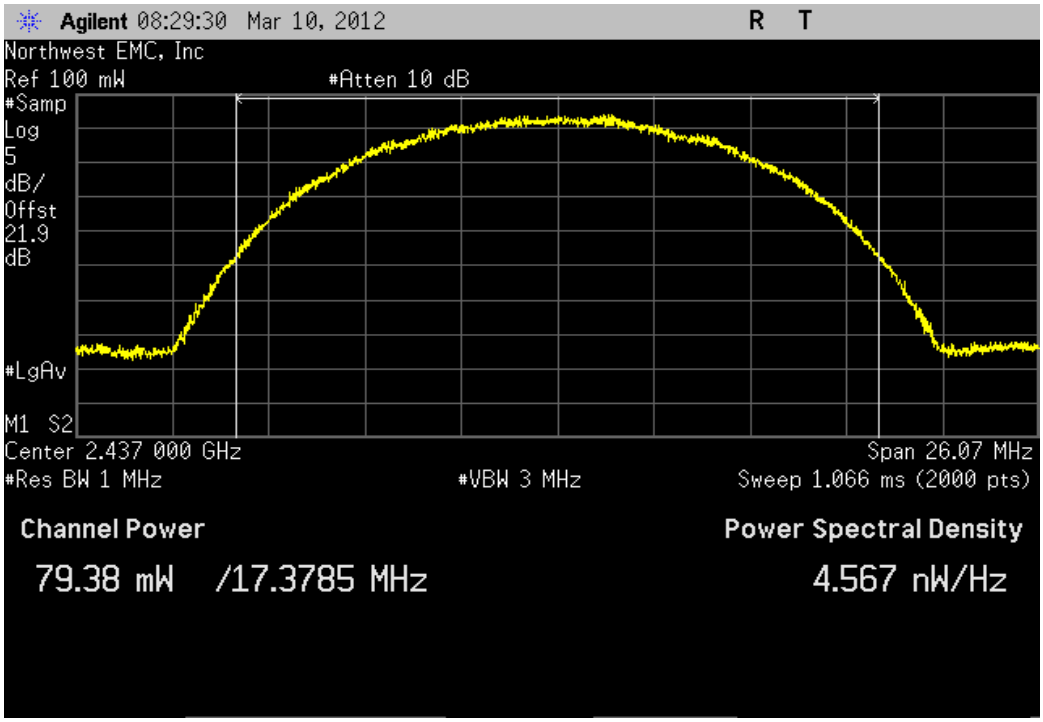
				Value	Limit	Result
				82.279 mW	< 1 W	Pass



Output Power

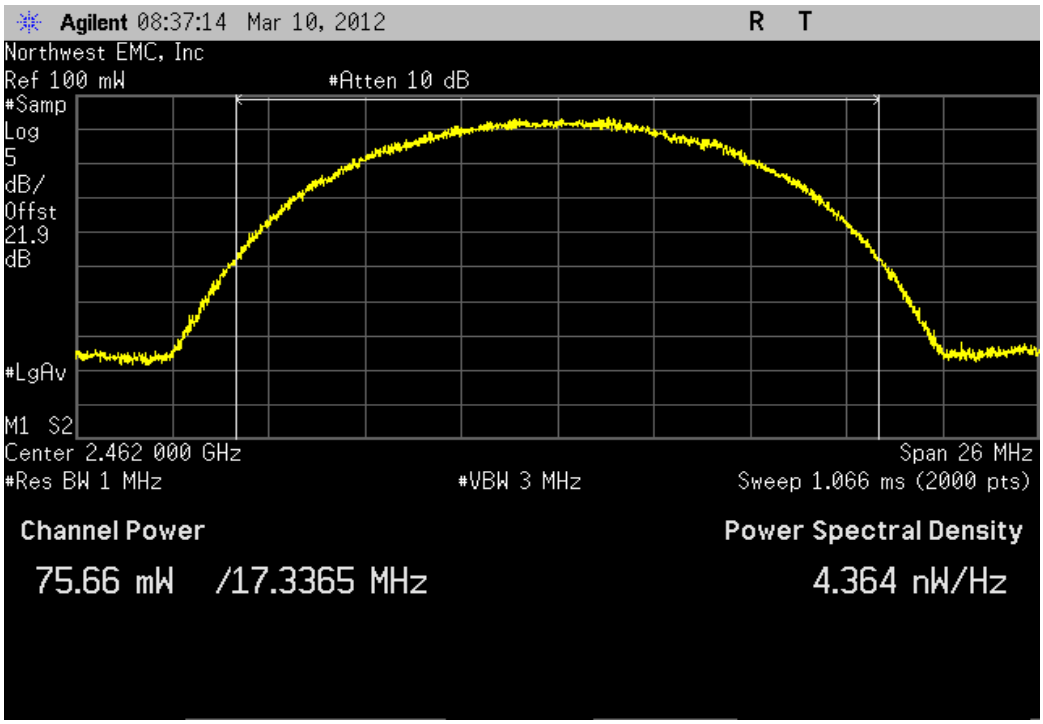
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz

				Value	Limit	Result
				79.375 mW	< 1 W	Pass



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz

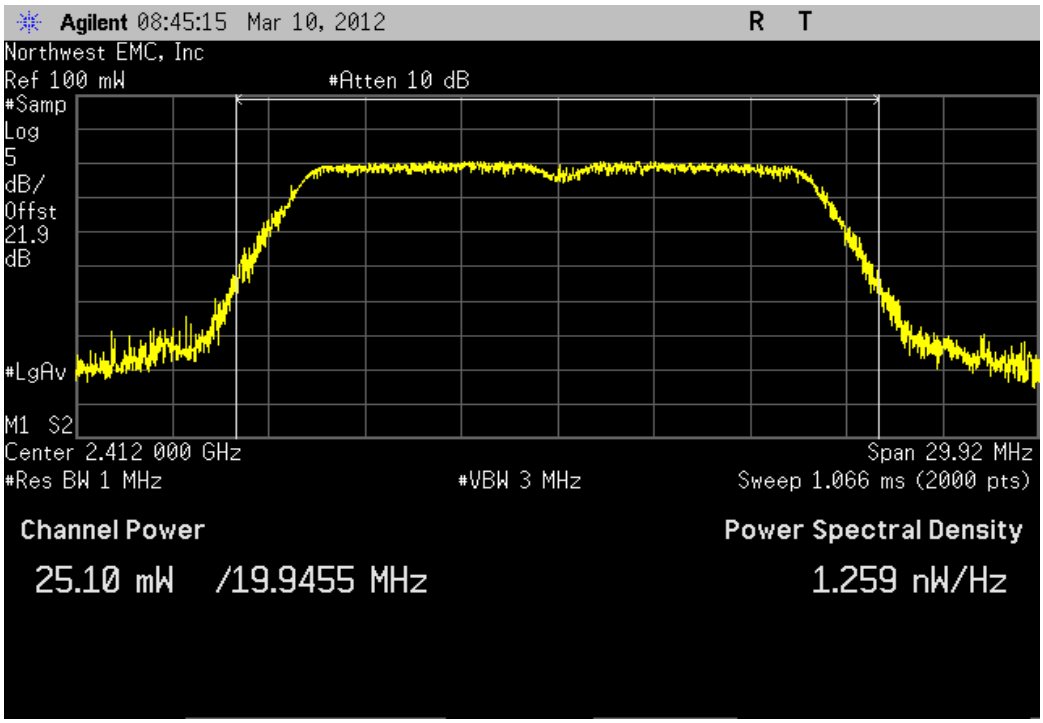
				Value	Limit	Result
				75.664 mW	< 1 W	Pass



Output Power

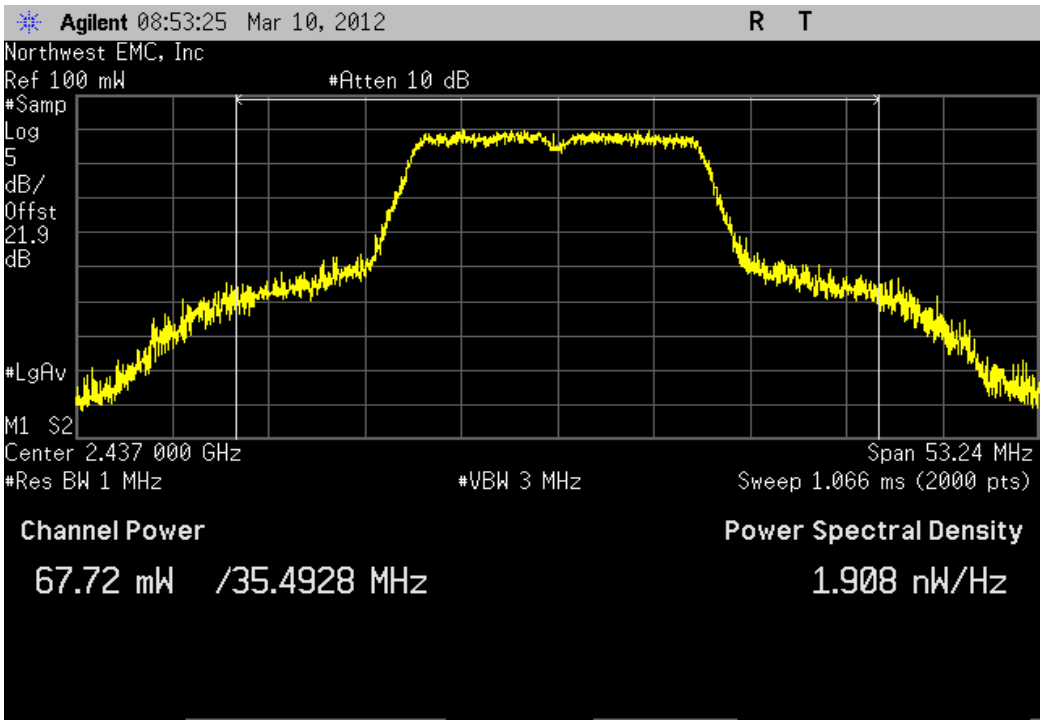
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz

				Value	Limit	Result
				25.101 mW	< 1 W	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz

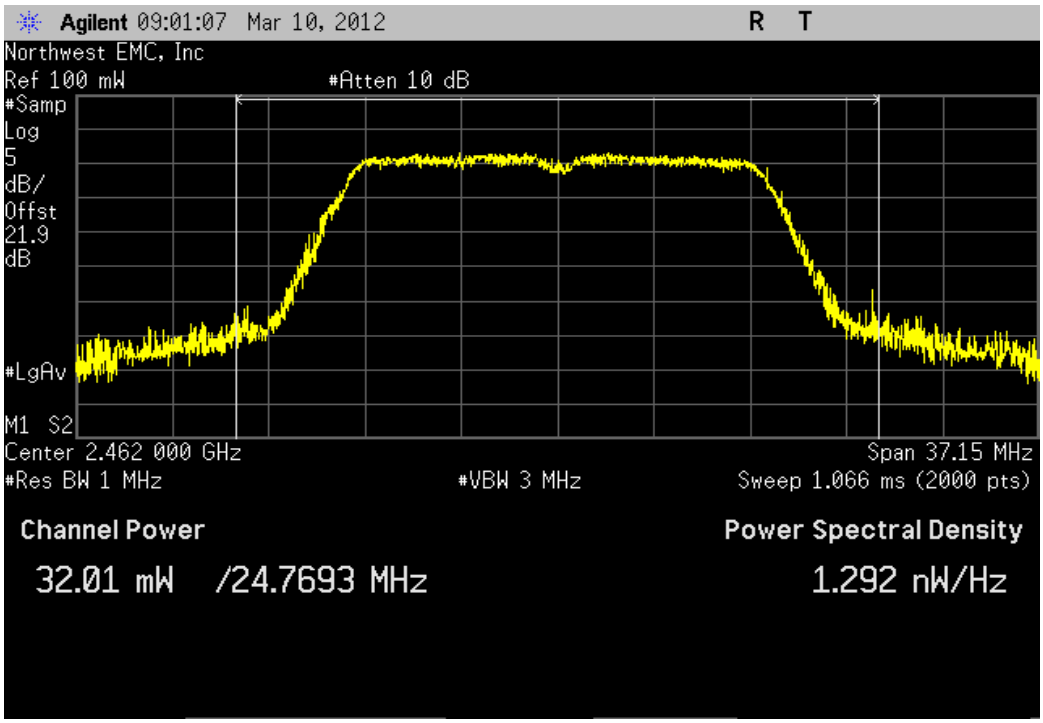
				Value	Limit	Result
				67.716 mW	< 1 W	Pass



Output Power

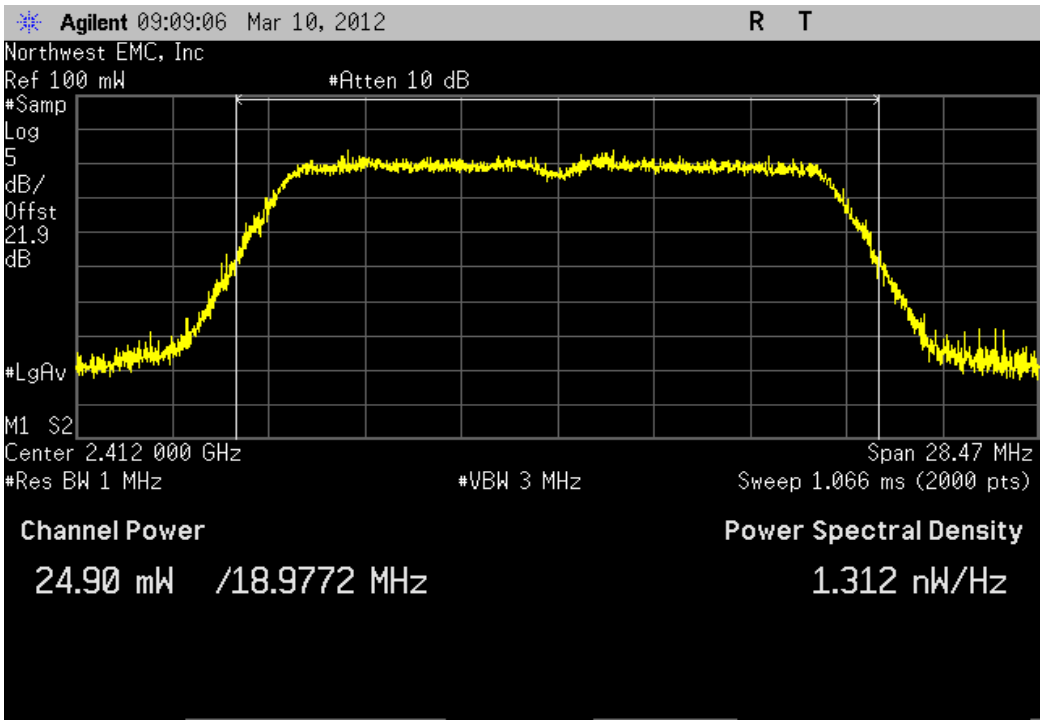
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz

				Value	Limit	Result
				32.01 mW	< 1 W	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz

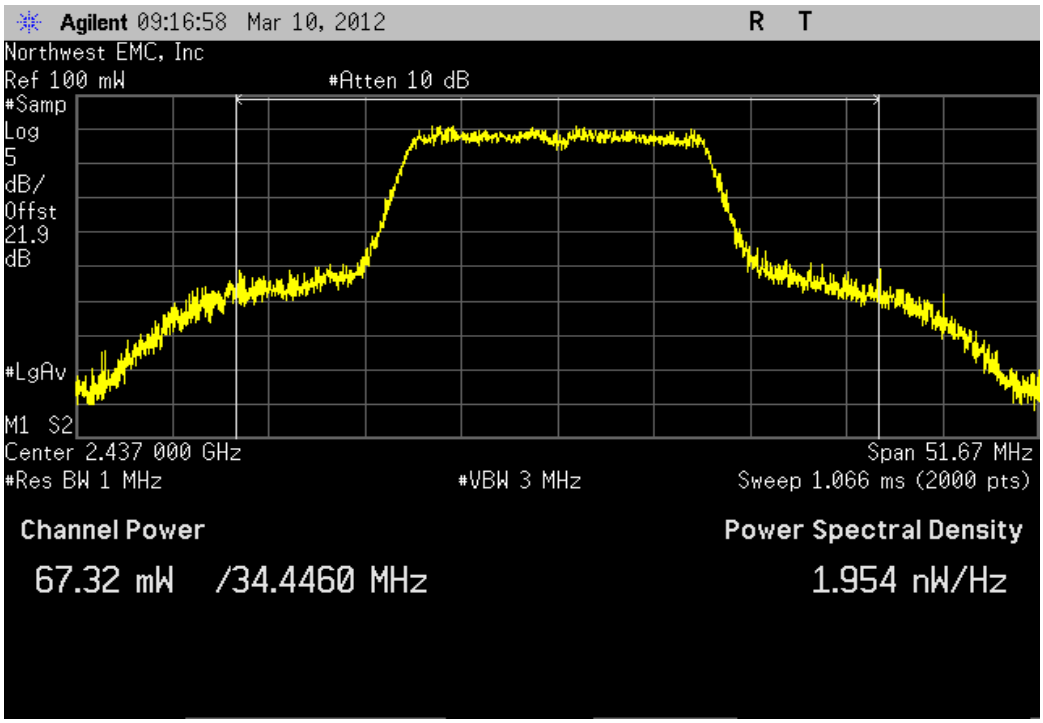
				Value	Limit	Result
				24.897 mW	< 1 W	Pass



Output Power

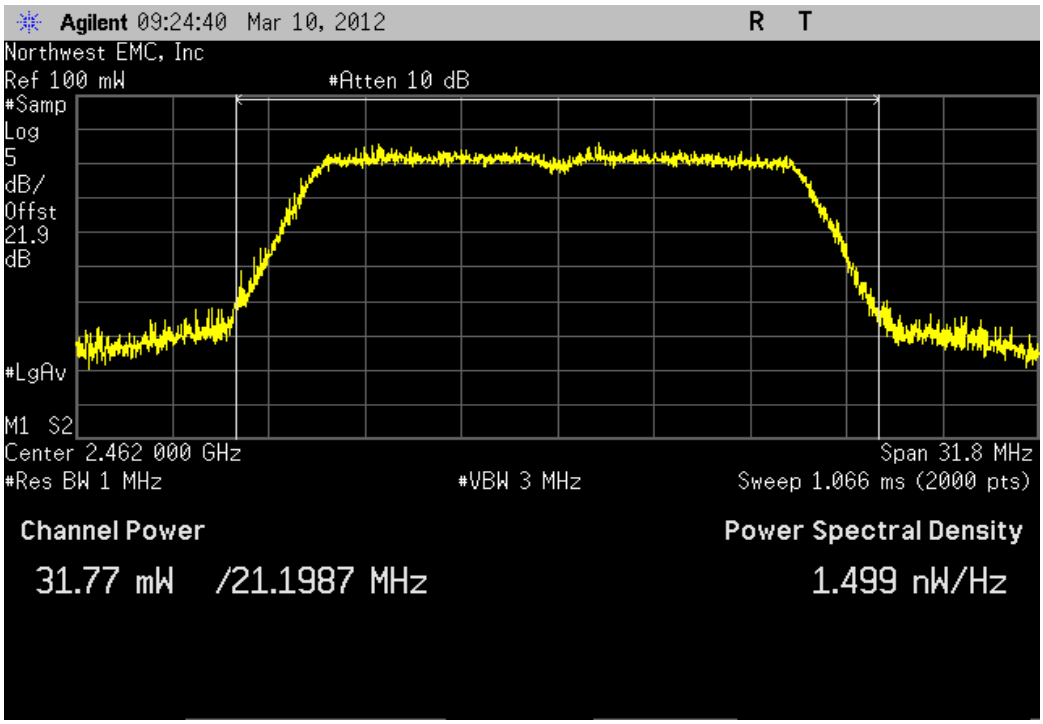
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz

				Value	Limit	Result
				67.317 mW	< 1 W	Pass



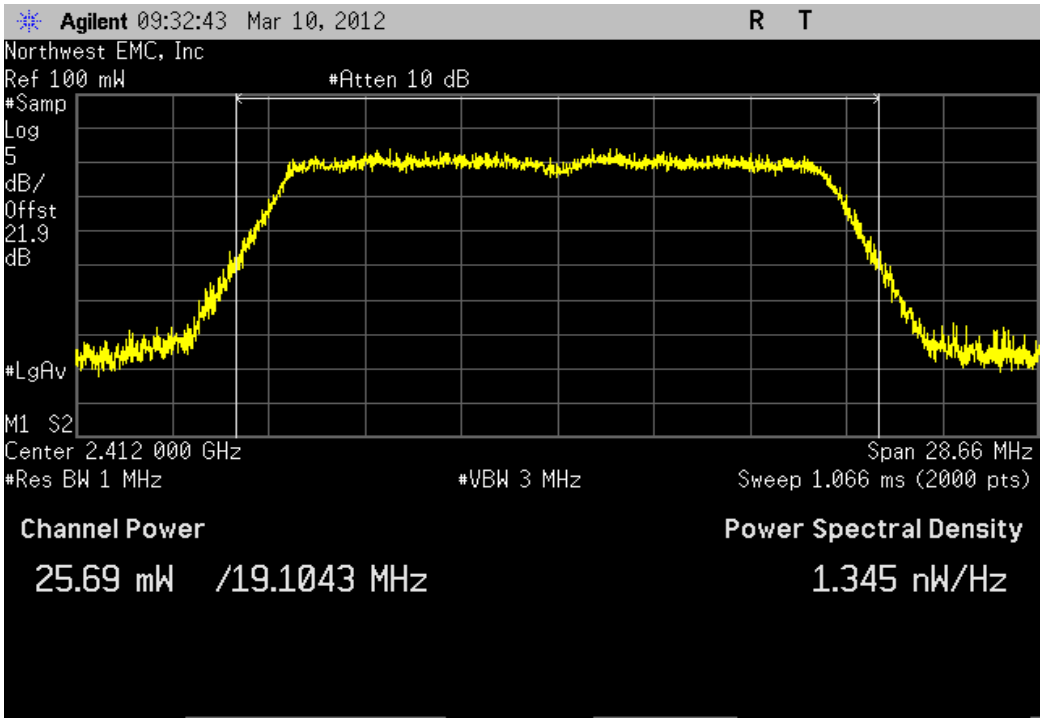
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz

				Value	Limit	Result
				31.773 mW	< 1 W	Pass



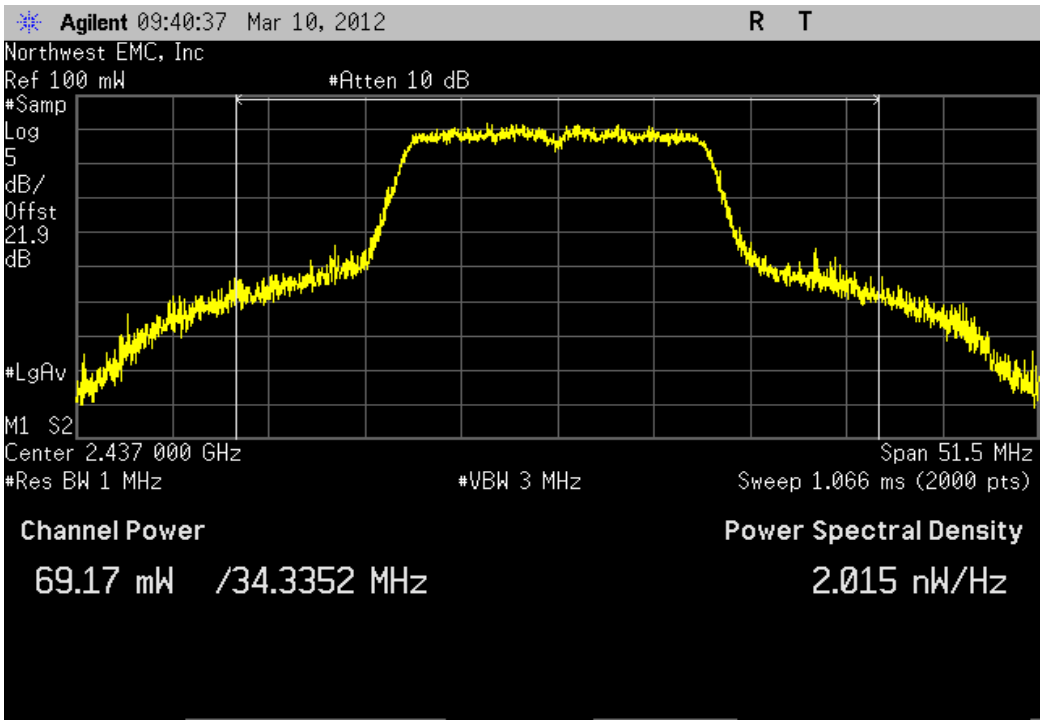
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz

				Value	Limit	Result
				25.688 mW	< 1 W	Pass



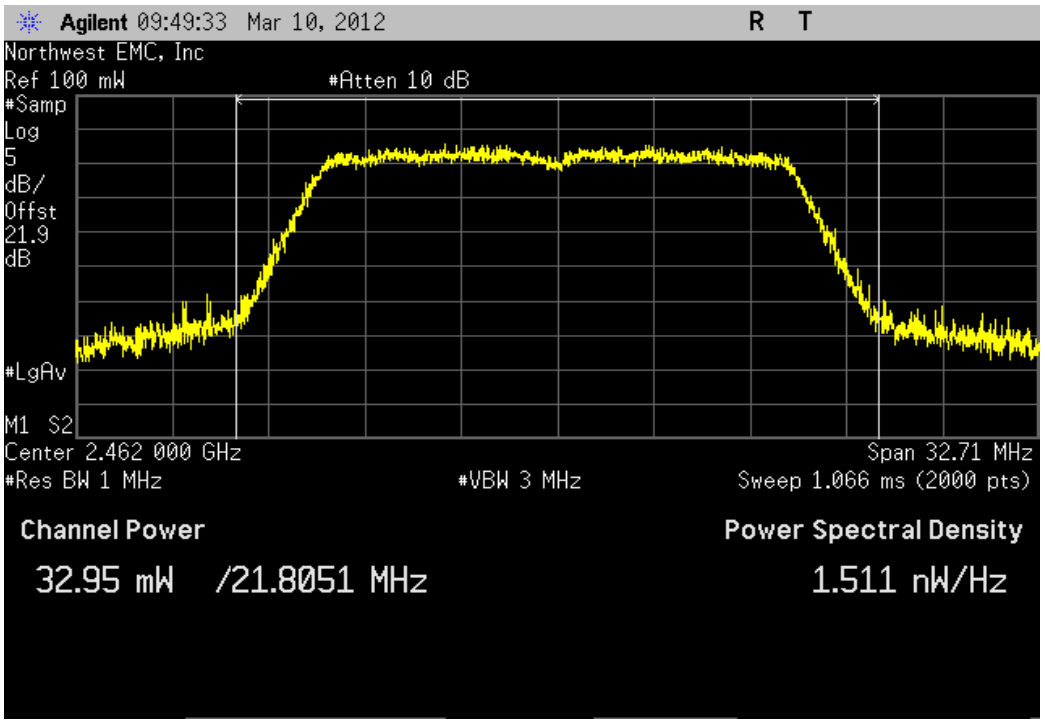
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz

				Value	Limit	Result
				69.17 mW	< 1 W	Pass



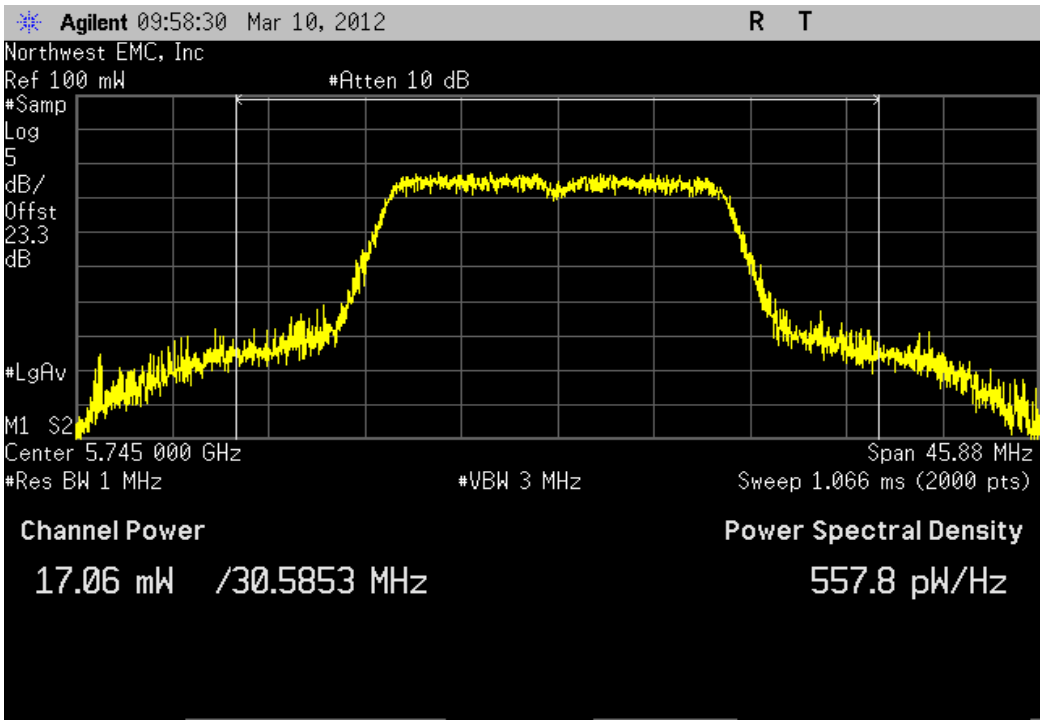
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz

				Value	Limit	Result
				32.95 mW	< 1 W	Pass



5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Low Channel 149, 5745 MHz

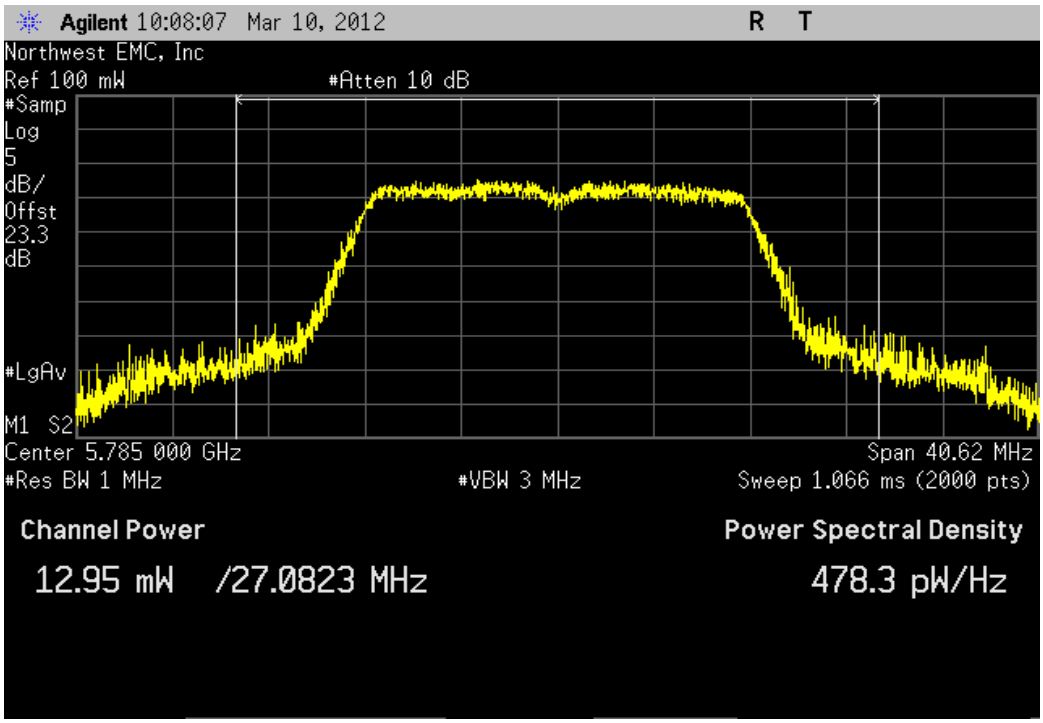
				Value	Limit	Result
				17.061 mW	< 1 W	Pass



Output Power

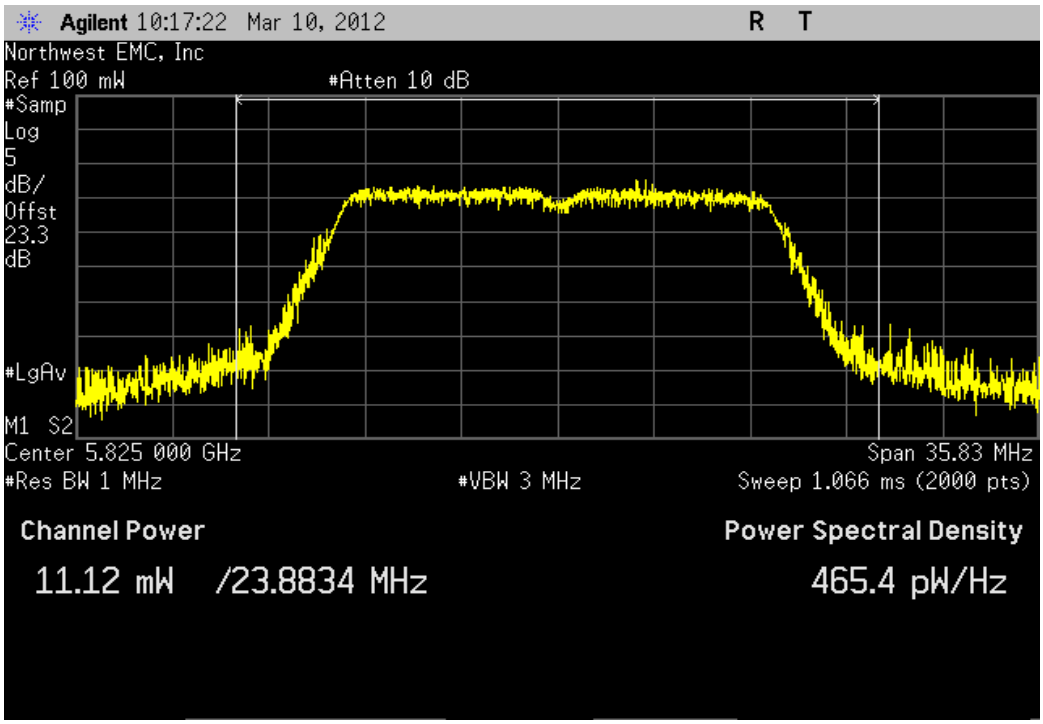
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Mid Channel 157, 5785 MHz

				Value	Limit	Result
				12.954 mW	< 1 W	Pass



5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, High Channel 165, 5825 MHz

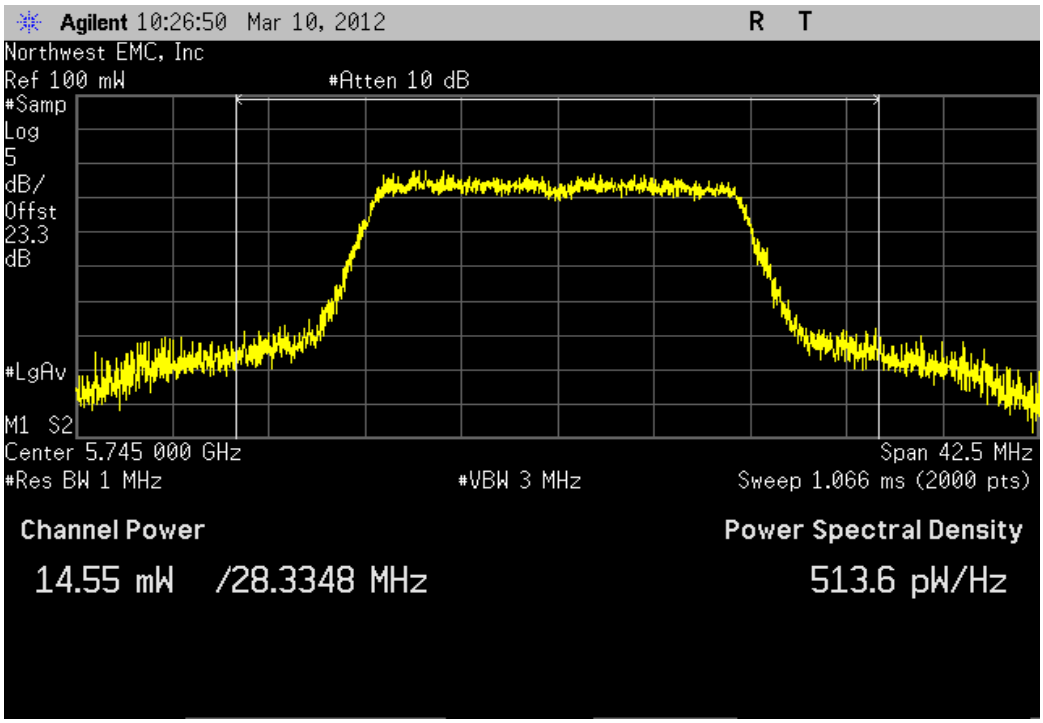
				Value	Limit	Result
				11.115 mW	< 1 W	Pass



Output Power

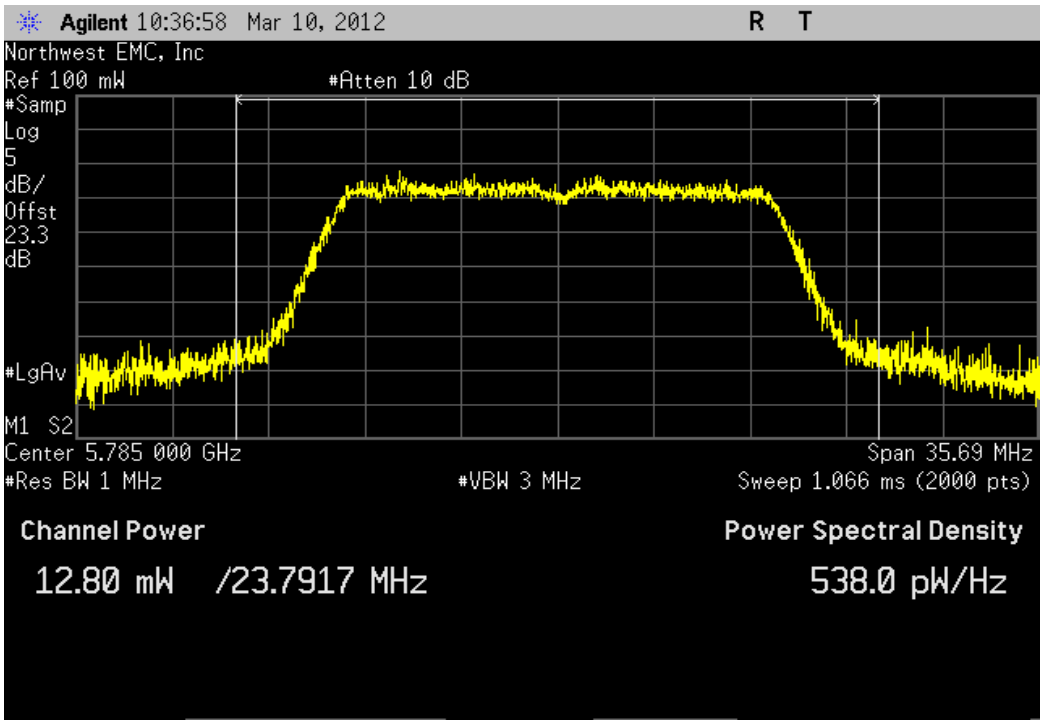
5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Low Channel 149, 5745 MHz

				Value	Limit	Result
				14.553 mW	< 1 W	Pass



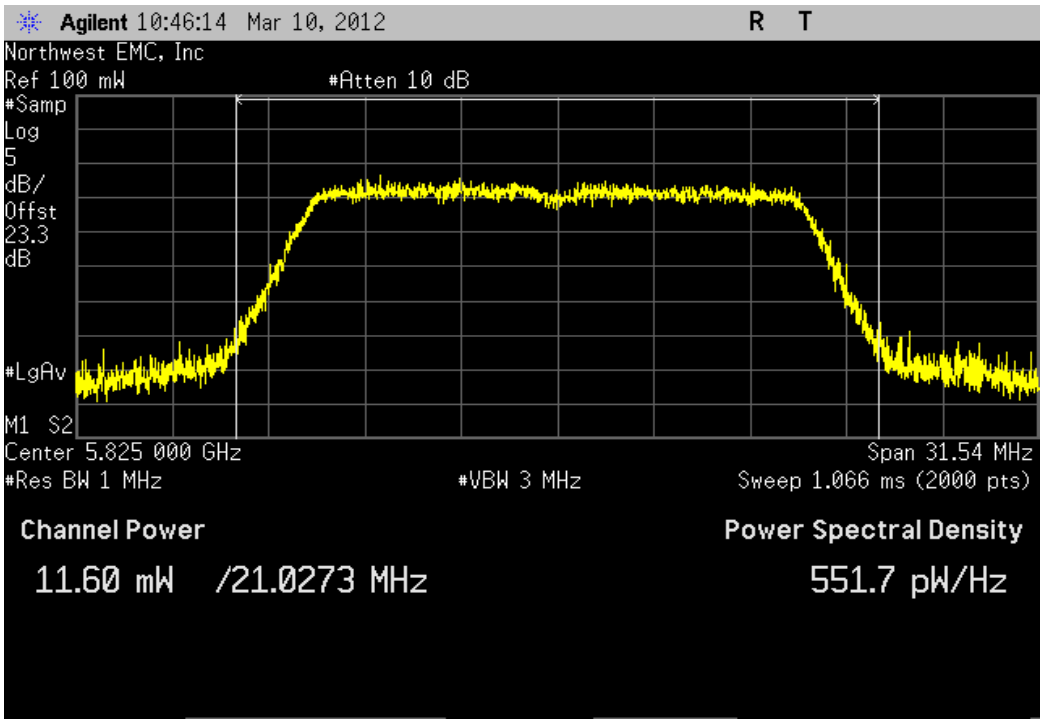
5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Mid Channel 157, 5785 MHz

				Value	Limit	Result
				12.801 mW	< 1 W	Pass



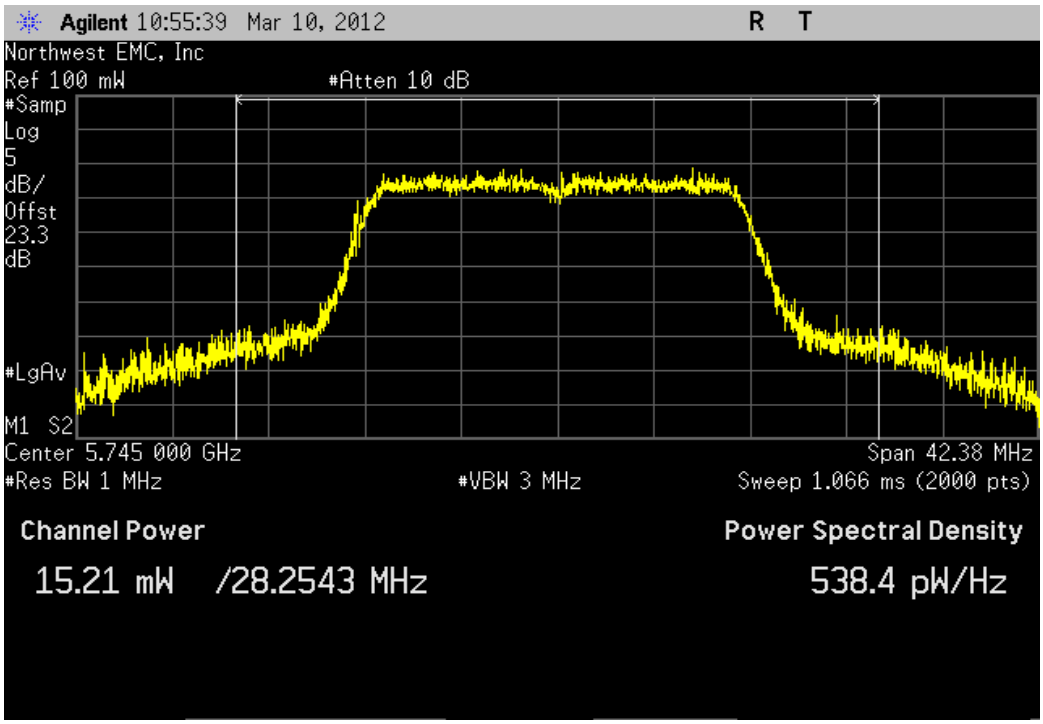
5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, High Channel 165, 5825 MHz

				Value	Limit	Result
				11.601 mW	< 1 W	Pass



5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Low Channel 149, 5745 MHz

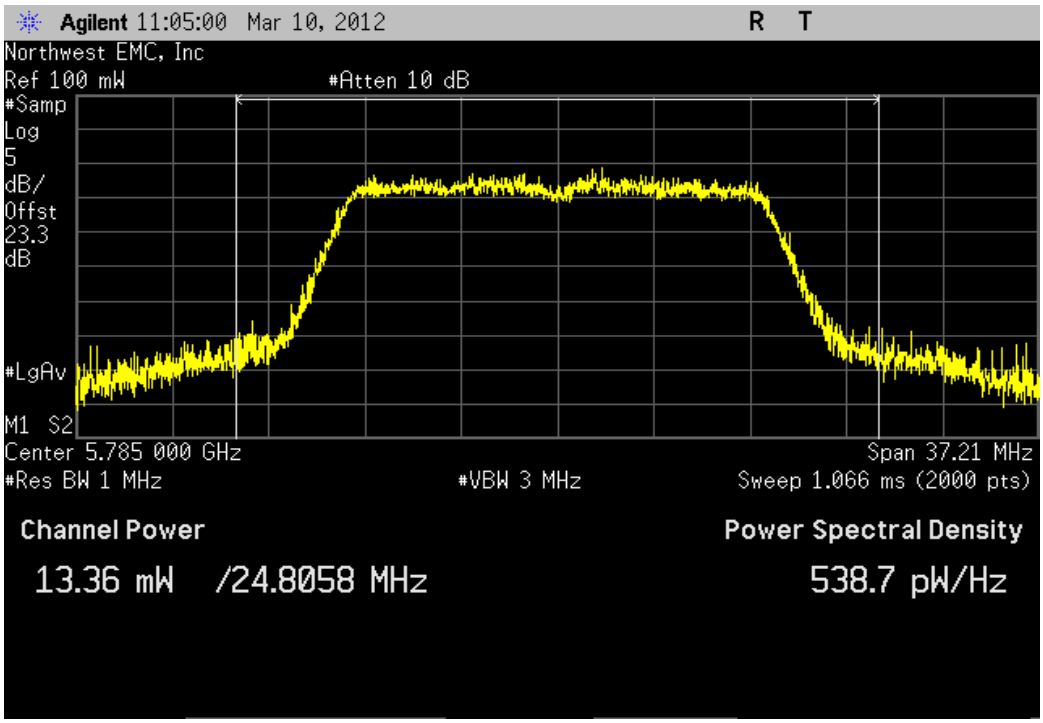
				Value	Limit	Result
				15.213 mW	< 1 W	Pass



Output Power

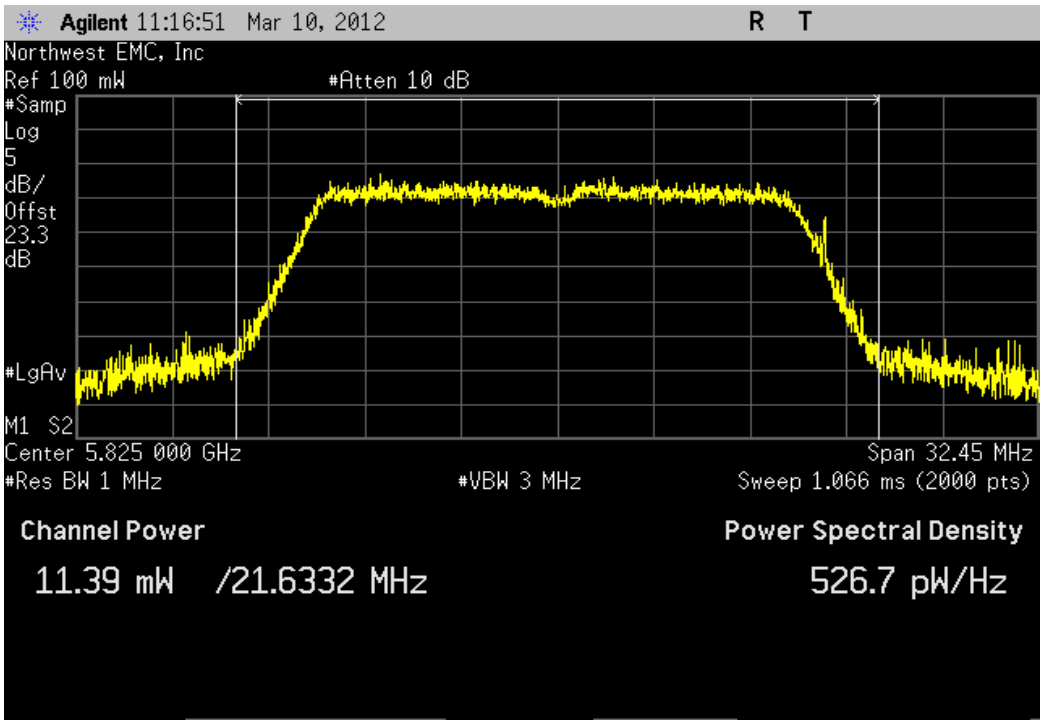
5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Mid Channel 157, 5785 MHz

				Value	Limit	Result
				13.362 mW	< 1 W	Pass



5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, High Channel 165, 5825 MHz

				Value	Limit	Result
				11.395 mW	< 1 W	Pass



Band Edge Compliance

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Attenuator SMA - 20dB, 40 GHz	Fairview Microwave	SA4014-20	AQI	10/12/2011	12
Signal Generator	Agilent	N5183A	TIA	1/27/2012	12
Spectrum Analyzer	Agilent	E4446A	AAT	3/2/2012	12

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in the ISM band. The channels closest to the band edges were selected. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the required data rates available in 802.11.

The spectrum was scanned across each band edge.

Band Edge Compliance

EUT:	Sigma Pumps Integrated 802.11abg Module			**Work Order:**	DGII0053
Serial Number:	7.06			**Date:**	03/20/12
Customer:	Digi International			**Temperature:**	22.78°C
Attendees:	None			**Humidity:**	55%
Project:	None			**Barometric Pres.:**	1007.8
Tested by:	Johnathan Lee	**Power:**	110VAC/60Hz	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2012	ANSI C63.10:2009

COMMENTS

Added second harmonic filter on 5GHz path (footprint exists on board for this filter). Duty Cycle was measured at 100% operation. Channel 149, 157, 165: Power level 50. Channels 1, 6, 11 at 1 Mbps, 11 Mbps and Channel 6 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 60. Channel 1 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 45. Channel 11 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 50.

DEVIATIONS FROM TEST STANDARD

None

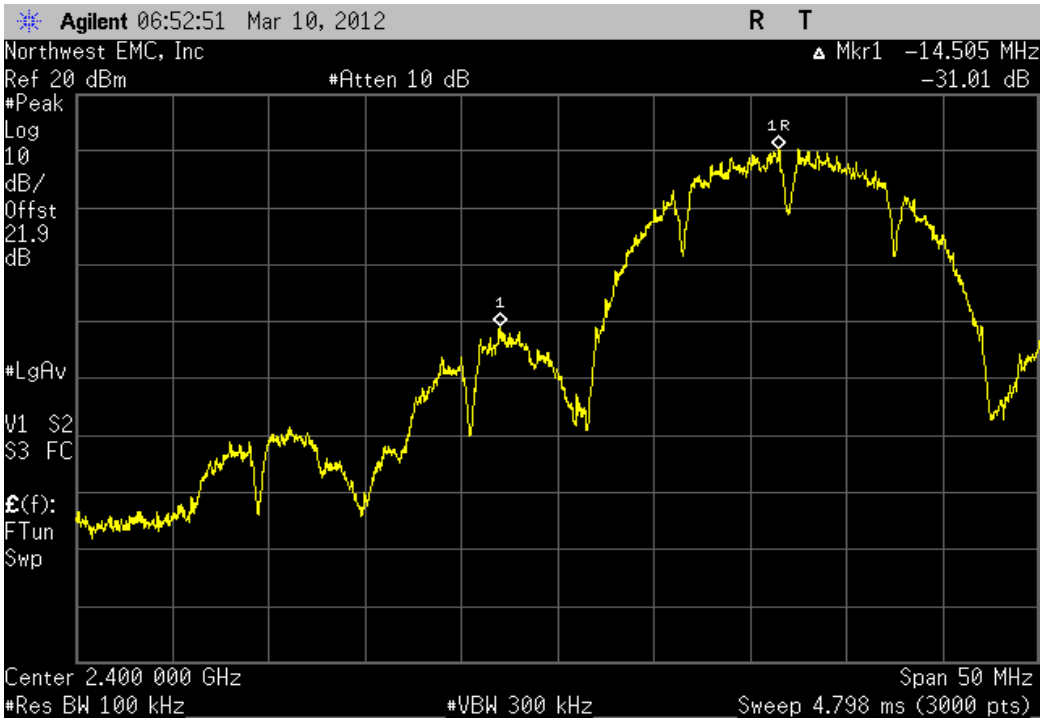
Configuration #	2	Signature	Trevor Bulls

		Value	Limit	Result
2400 MHz - 2483.5 MHz Band				
	802.11(b) 1 Mbps			
	Low Channel 1, 2412 MHz	-31.01 dBc	≤ -20 dBc	Pass
	High Channel 11, 2462 MHz	-53.41 dBc	≤ -20 dBc	Pass
	802.11(b) 11 Mbps			
	Low Channel 1, 2412 MHz	-31.7 dBc	≤ -20 dBc	Pass
	High Channel 11, 2462 MHz	-54.45 dBc	≤ -20 dBc	Pass
	802.11(g) 6 Mbps			
	Low Channel 1, 2412 MHz	-28.17 dBc	≤ -20 dBc	Pass
	High Channel 11, 2462 MHz	-36.36 dBc	≤ -20 dBc	Pass
	802.11(g) 36 Mbps			
	Low Channel 1, 2412 MHz	-28.32 dBc	≤ -20 dBc	Pass
	High Channel 11, 2462 MHz	-36.44 dBc	≤ -20 dBc	Pass
	802.11(g) 54 Mbps			
	Low Channel 1, 2412 MHz	-28.95 dBc	≤ -20 dBc	Pass
	High Channel 11, 2462 MHz	-39.35 dBc	≤ -20 dBc	Pass
5725 MHz - 5850 MHz Band				
	802.11(a) 6 Mbps			
	Low Channel 149, 5745 MHz	-32.6 dBc	≤ -20 dBc	Pass
	High Channel 165, 5825 MHz	-43.99 dBc	≤ -20 dBc	Pass
	802.11(a) 36 Mbps			
	Low Channel 149, 5745 MHz	-32.2 dBc	≤ -20 dBc	Pass
	High Channel 165, 5825 MHz	-46.25 dBc	≤ -20 dBc	Pass
	802.11(a) 54 Mbps			
	Low Channel 149, 5745 MHz	-32.78 dBc	≤ -20 dBc	Pass
	High Channel 165, 5825 MHz	-46.04 dBc	≤ -20 dBc	Pass

Band Edge Compliance

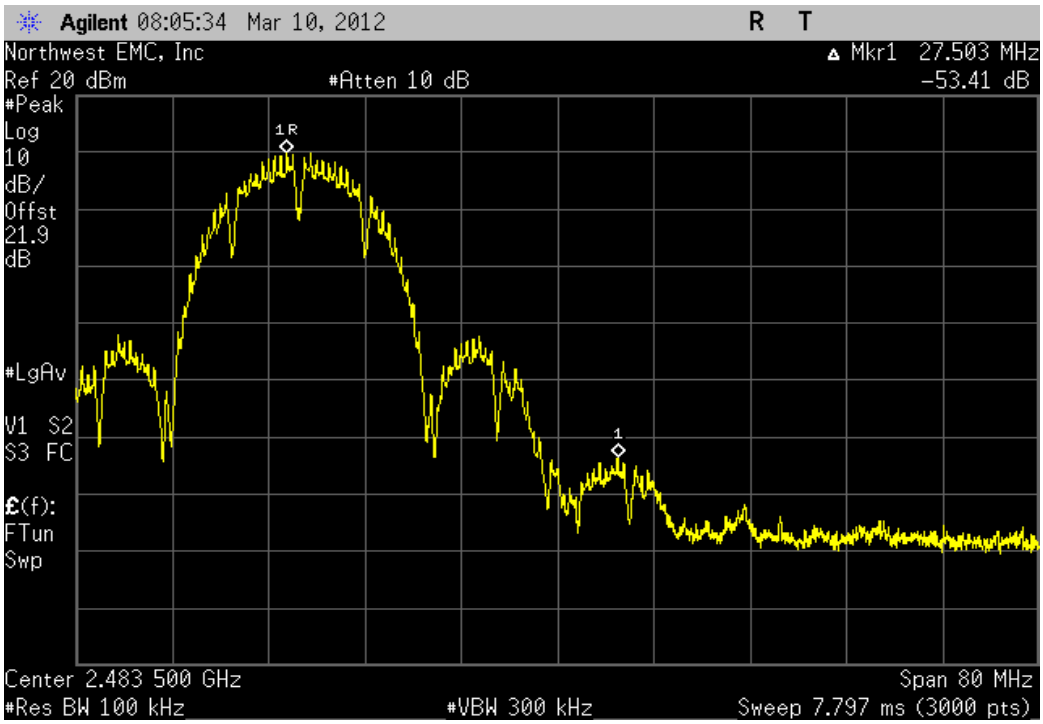
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz

				Value	Limit	Result
				-31.01 dBc	≤ -20 dBc	Pass



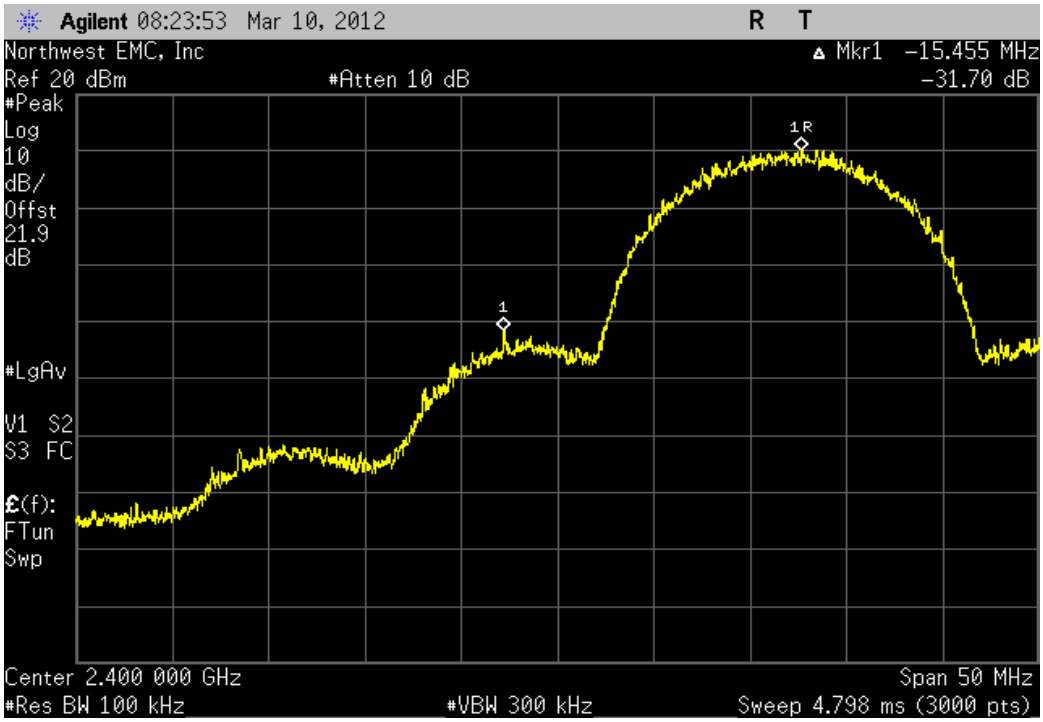
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz

				Value	Limit	Result
				-53.41 dBc	≤ -20 dBc	Pass



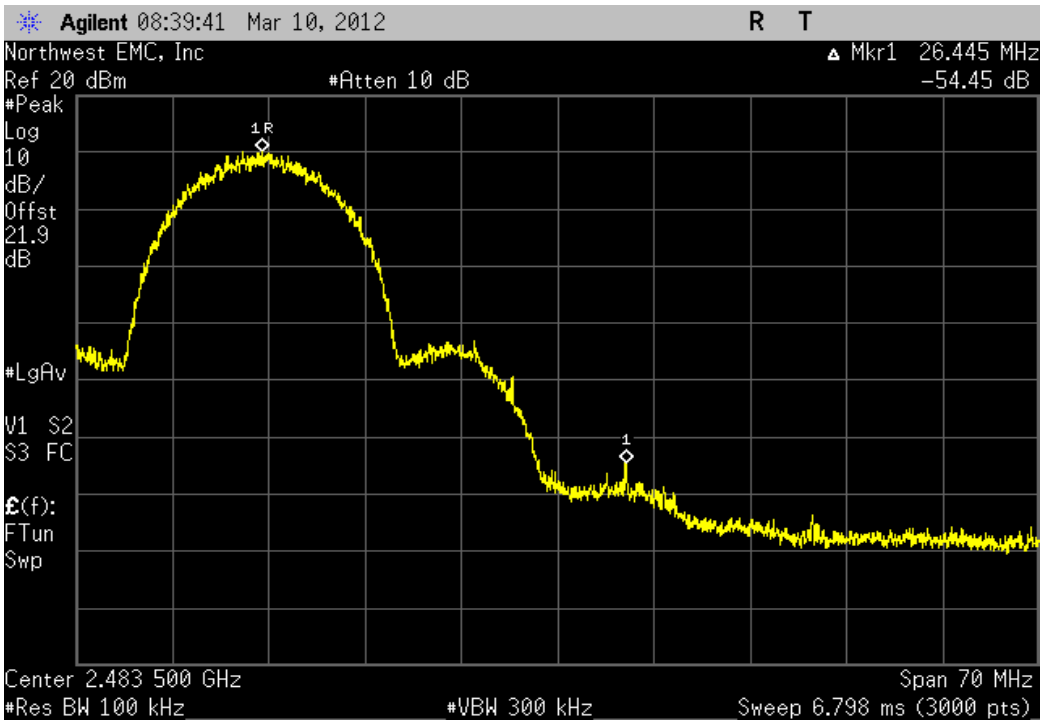
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz

				Value	Limit	Result
				-31.7 dBc	≤ -20 dBc	Pass



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz

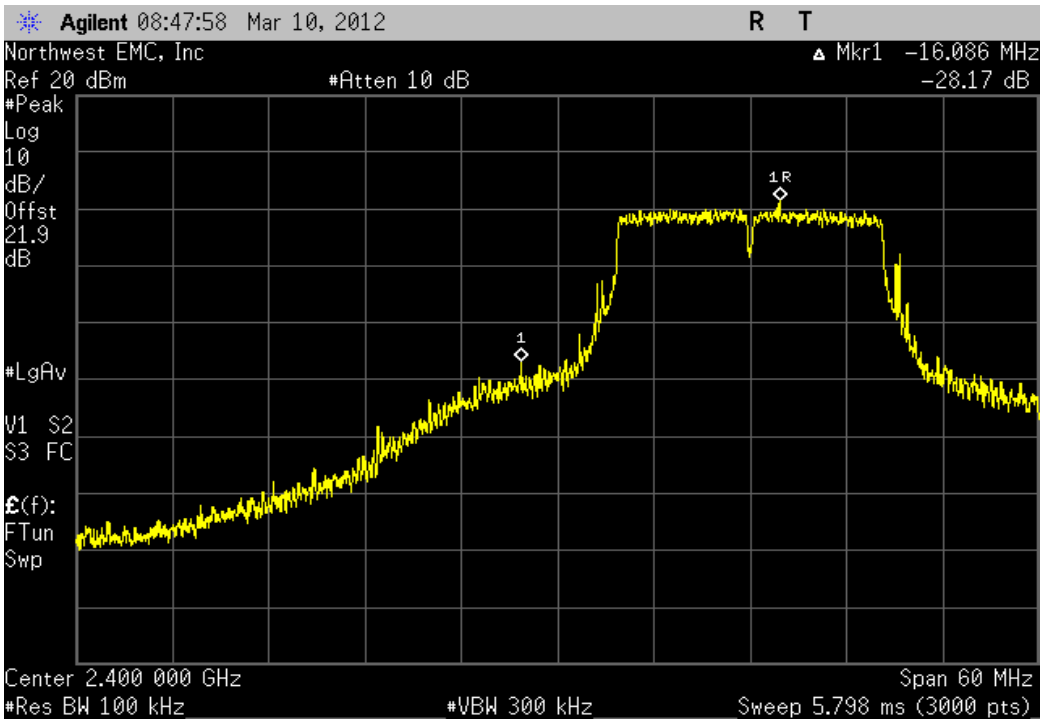
				Value	Limit	Result
				-54.45 dBc	≤ -20 dBc	Pass



Band Edge Compliance

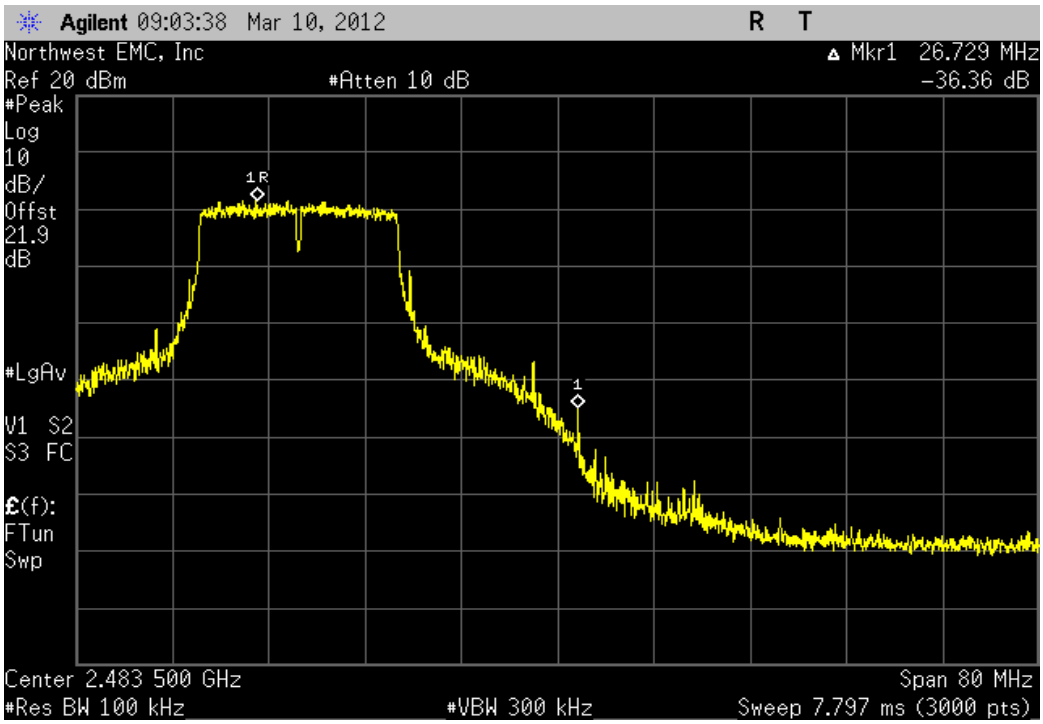
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz

Value	Limit	Result
-28.17 dBc	≤ -20 dBc	Pass



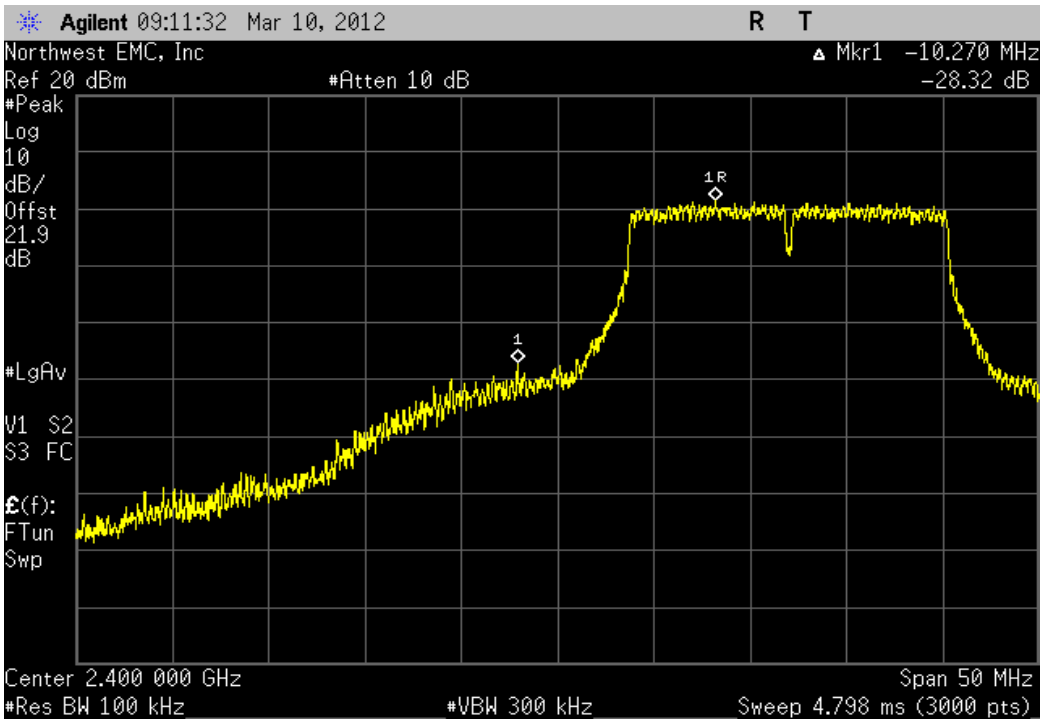
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz

Value	Limit	Result
-36.36 dBc	≤ -20 dBc	Pass

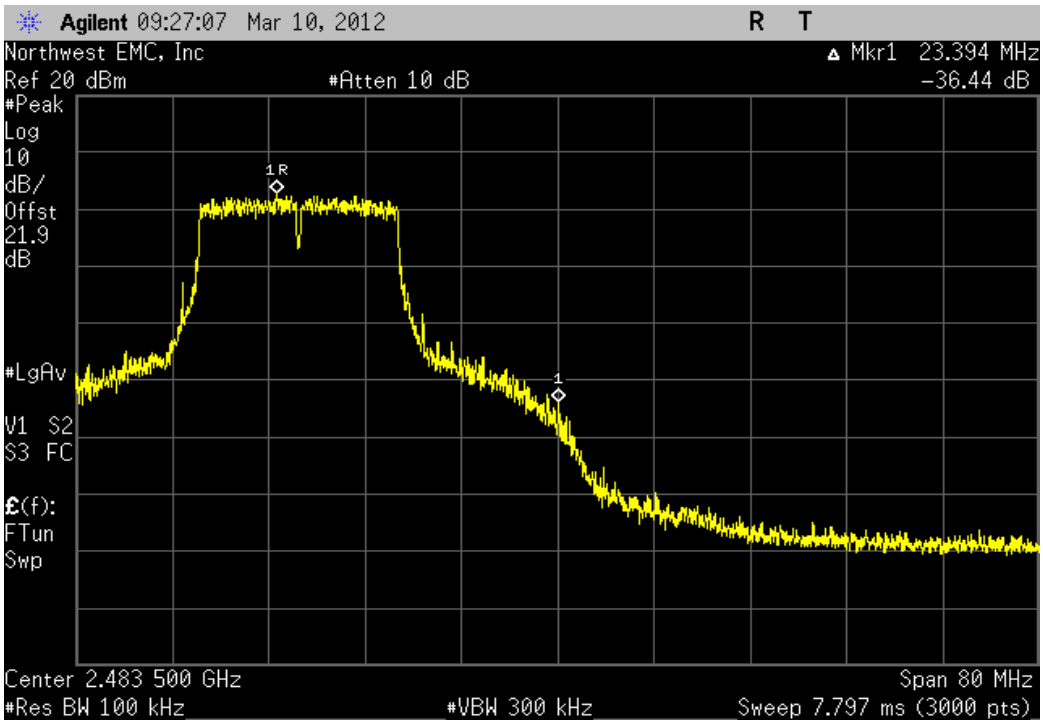


Band Edge Compliance

2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit	Result
				-28.32 dBc	≤ -20 dBc	Pass

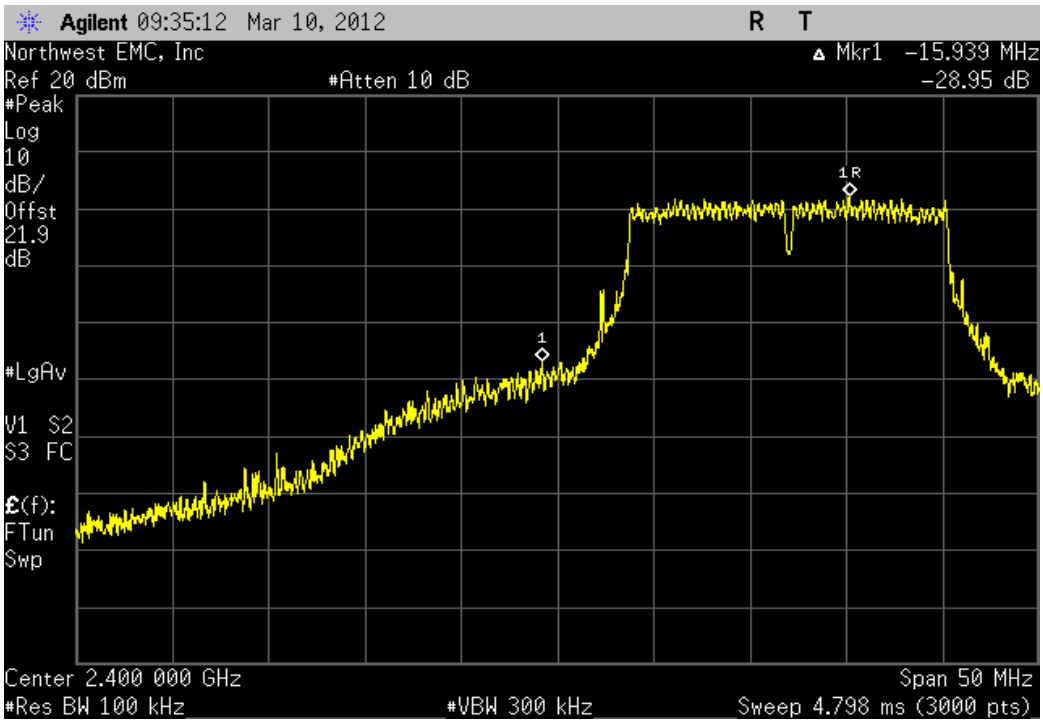


2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
				Value	Limit	Result
				-36.44 dBc	≤ -20 dBc	Pass



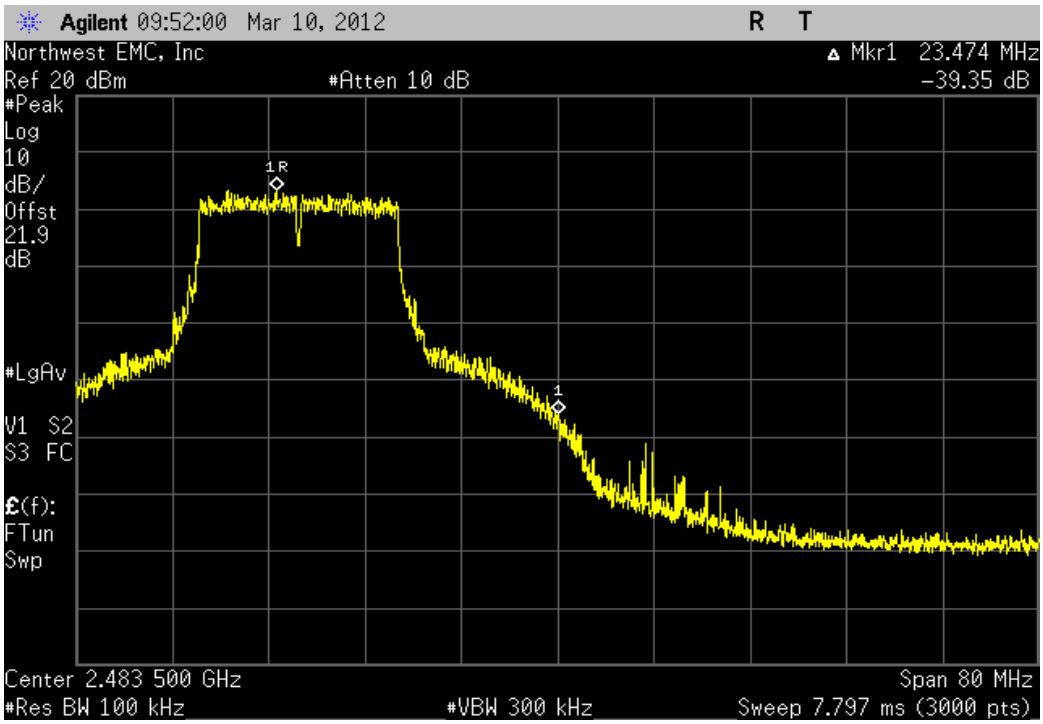
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz

				Value	Limit	Result
				-28.95 dBc	≤ -20 dBc	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz

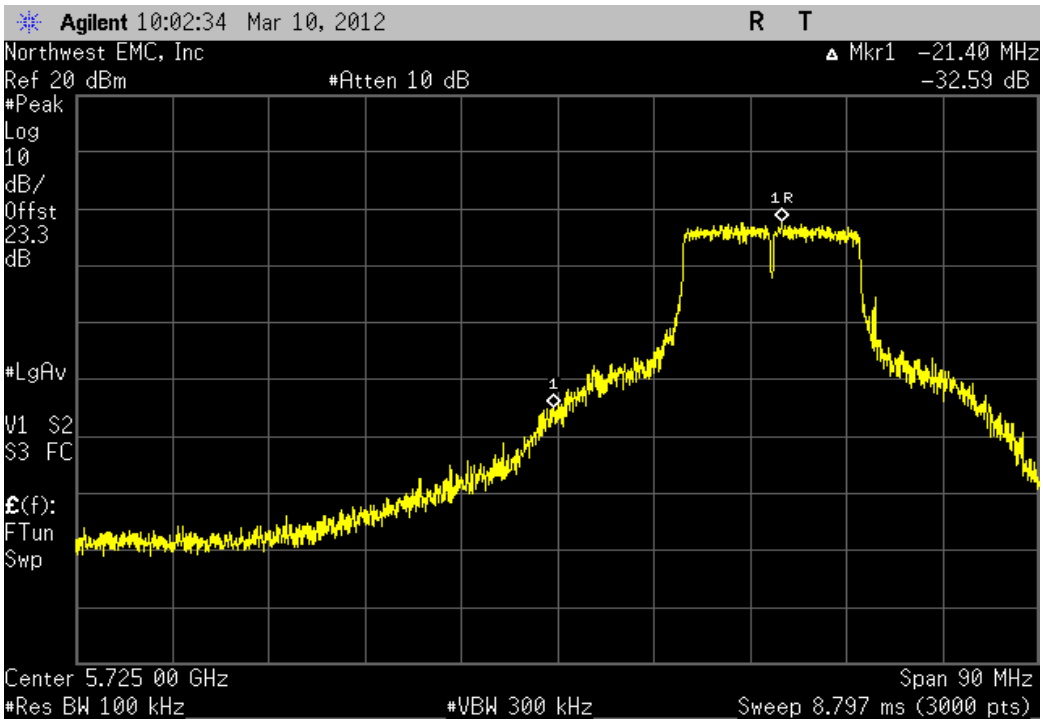
				Value	Limit	Result
				-39.35 dBc	≤ -20 dBc	Pass



Band Edge Compliance

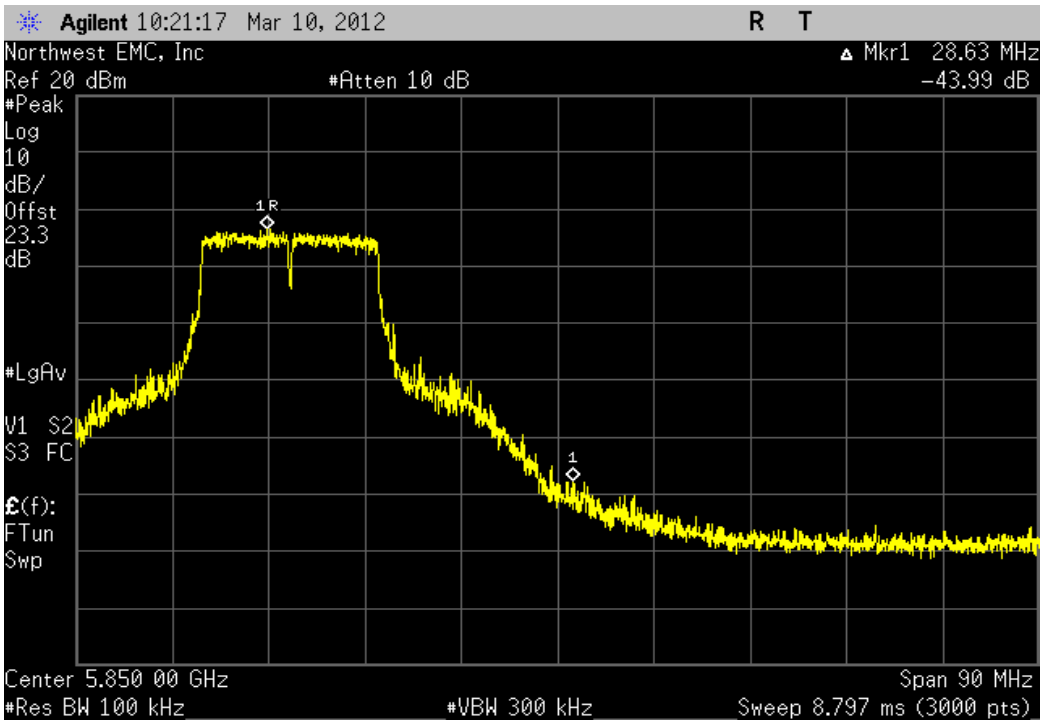
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Low Channel 149, 5745 MHz

				Value	Limit	Result
				-32.6 dBc	≤ -20 dBc	Pass



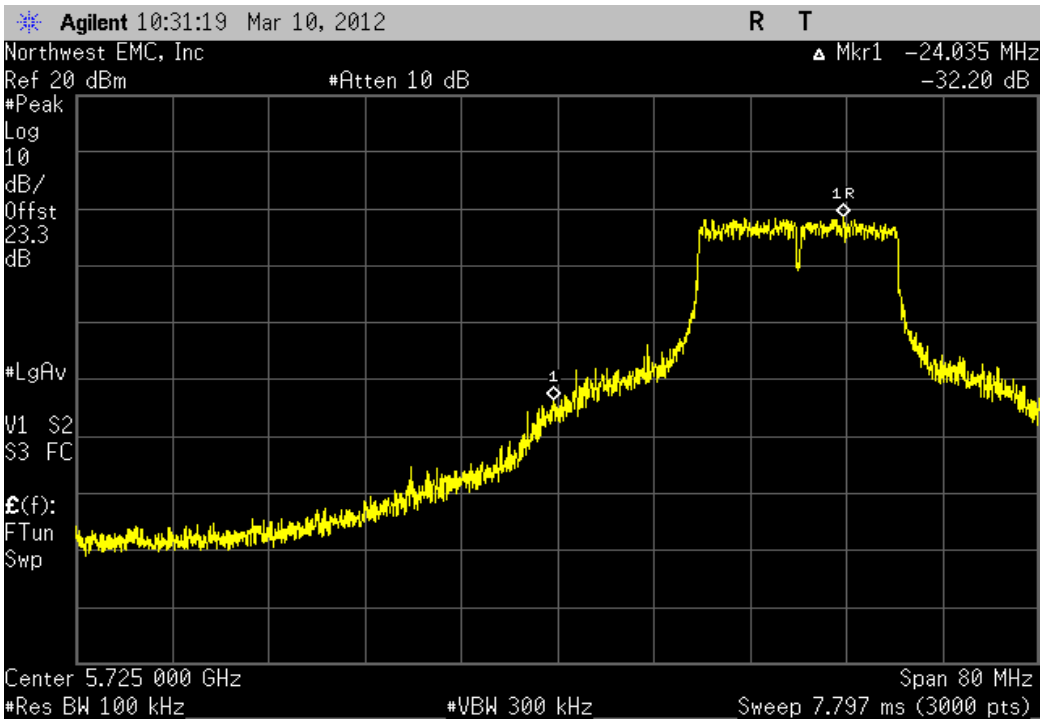
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, High Channel 165, 5825 MHz

				Value	Limit	Result
				-43.99 dBc	≤ -20 dBc	Pass

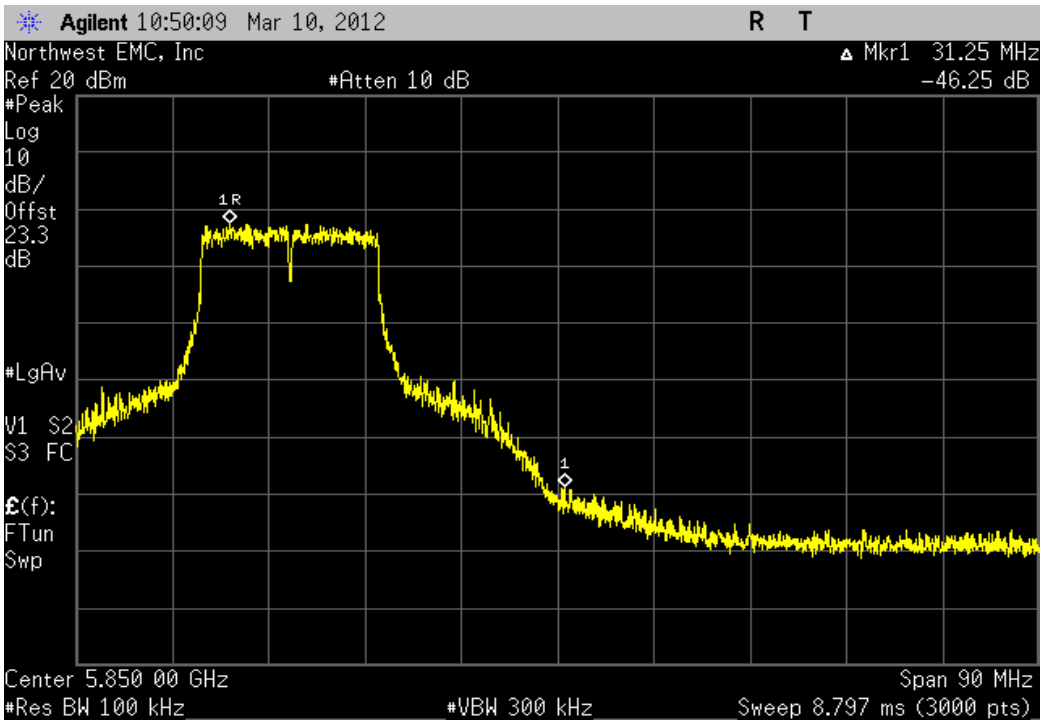


Band Edge Compliance

5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Low Channel 149, 5745 MHz						
				Value	Limit	Result
				-32.2 dBc	≤ -20 dBc	Pass



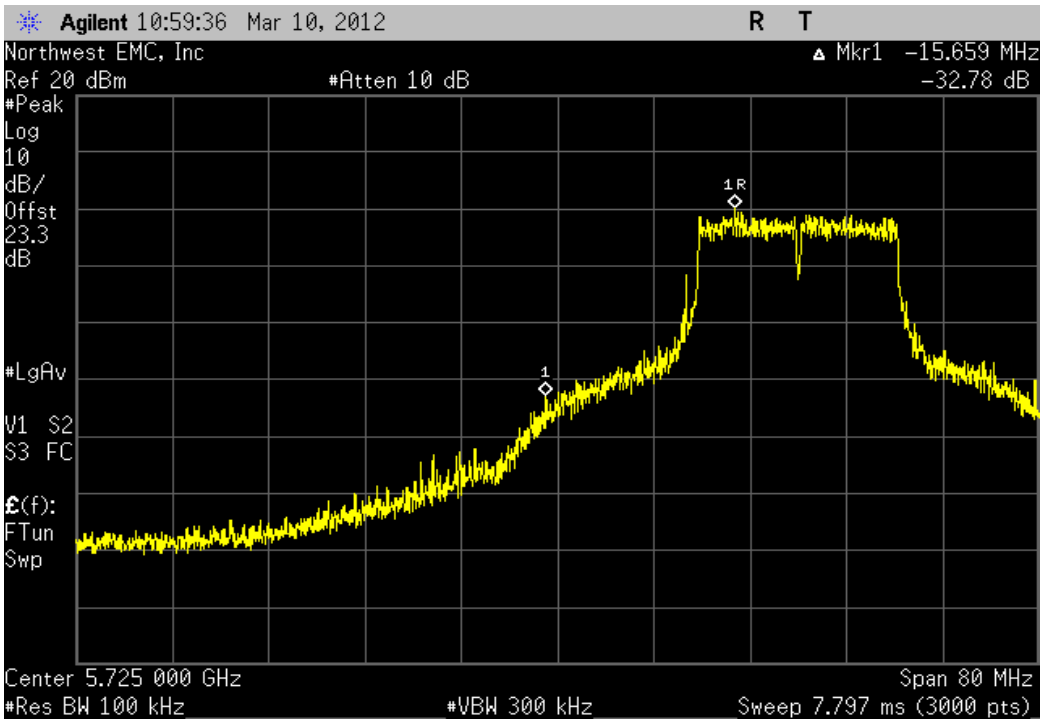
5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, High Channel 165, 5825 MHz						
				Value	Limit	Result
				-46.25 dBc	≤ -20 dBc	Pass



Band Edge Compliance

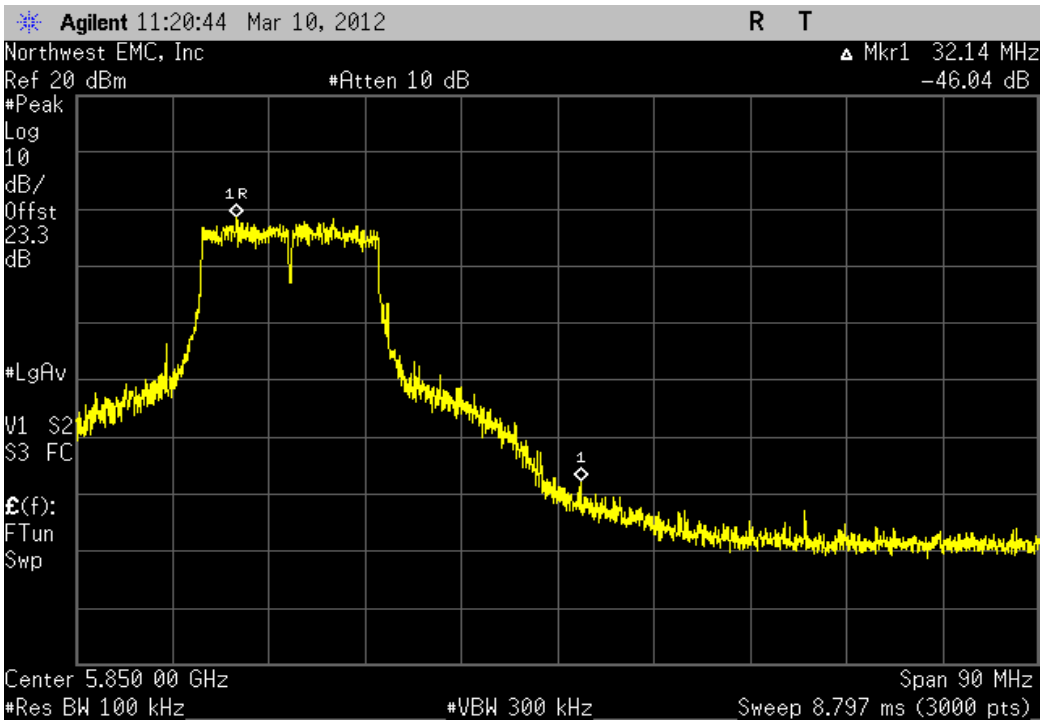
5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Low Channel 149, 5745 MHz

				Value	Limit	Result
				-32.78 dBc	≤ -20 dBc	Pass



5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, High Channel 165, 5825 MHz

				Value	Limit	Result
				-46.04 dBc	≤ -20 dBc	Pass



Spurious Conducted Emissions

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Attenuator SMA - 20dB, 40 GHz	Fairview Microwave	SA4014-20	AQI	10/12/2011	12
Signal Generator	Agilent	N5183A	TIA	1/27/2012	12
Spectrum Analyzer	Agilent	E4446A	AAT	3/2/2012	12

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The spurious RF conducted emissions were measured with the EUT set to low, medium, and high transmit frequencies. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate using direct sequence modulation. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

Spurious Conducted Emissions

EUT:	Sigma Pumps Integrated 802.11abg Module			**Work Order:**	DGII0053
Serial Number:	7.06			**Date:**	03/20/12
Customer:	Digi International			**Temperature:**	22.78°C
Attendees:	None			**Humidity:**	55%
Project:	None			**Barometric Pres.:**	1007.8
Tested by:	Johnathan Lee	**Power:**	110VAC/60Hz	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2012	ANSI C63.10:2009

COMMENTS

Added second harmonic filter on 5GHz path (footprint exists on board for this filter). Duty Cycle was measured at 100% operation. Channel 149, 157, 165: Power level 50. Channels 1, 6, 11 at 1 Mbps, 11 Mbps and Channel 6 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 60. Channel 1 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 45. Channel 11 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 50.

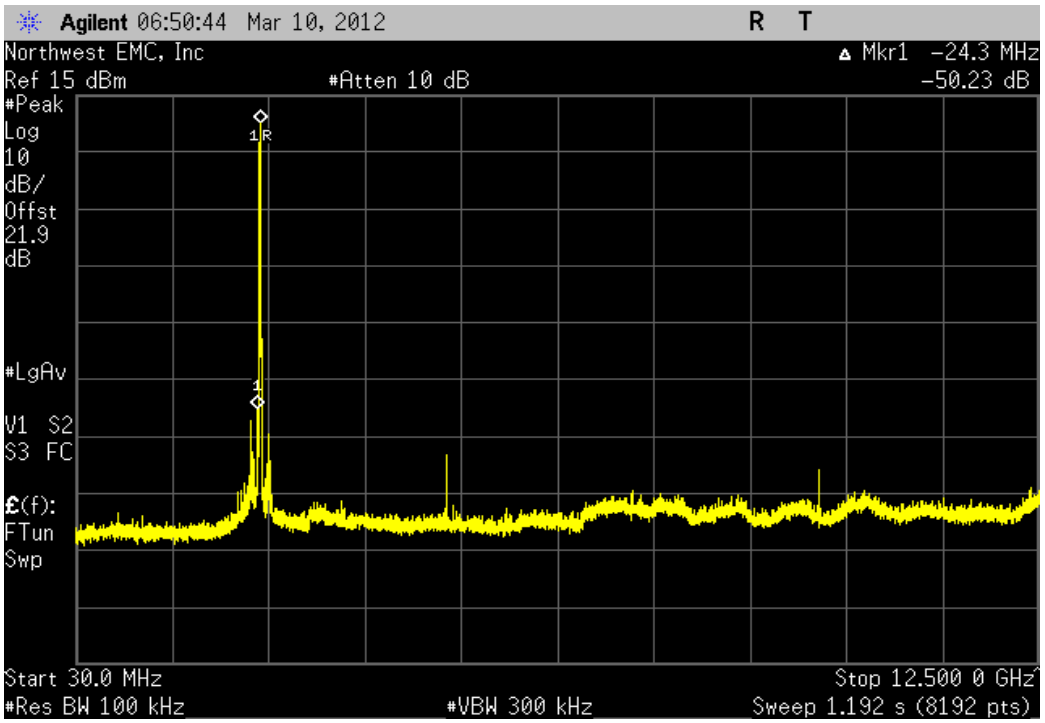
DEVIATIONS FROM TEST STANDARD

None

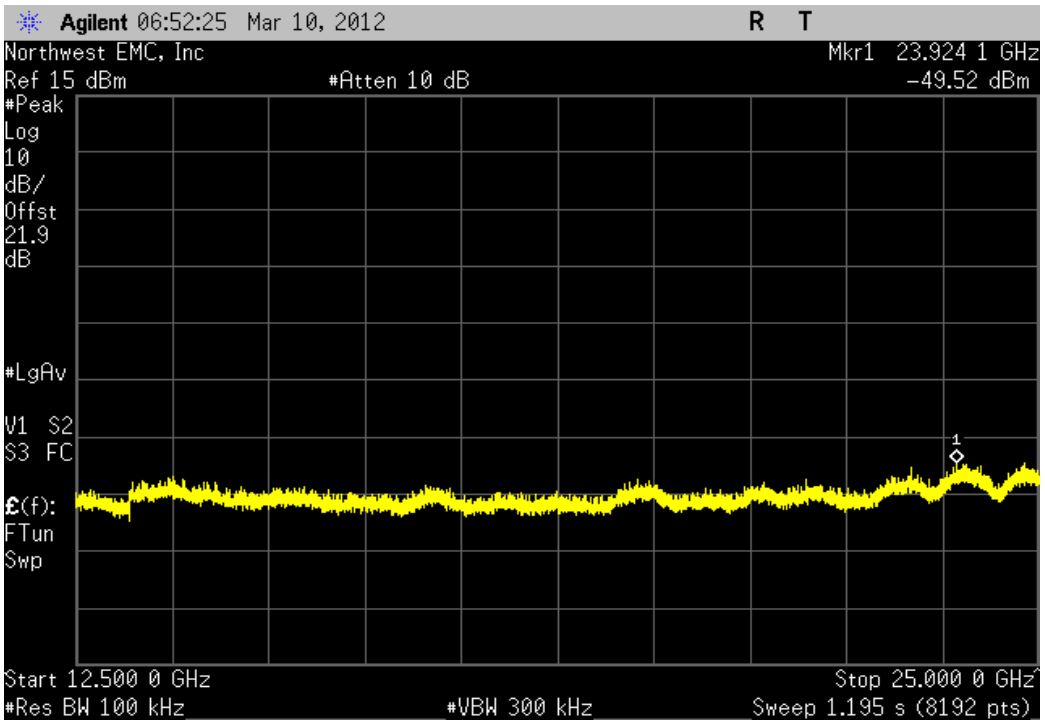
Configuration #	2	Signature	Trevor Bids

		Frequency Range	Value	Limit	Result
2400 MHz - 2483.5 MHz Band					
	802.11(b) 1 Mbps				
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	-50.23 dBc	≤ -20 dBc	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	-59.58 dBc	≤ -20 dBc	Pass
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-50.11 dBc	≤ -20 dBc	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	-57.98 dBc	≤ -20 dBc	Pass
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-50.05 dBc	≤ -20 dBc	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	-57.99 dBc	≤ -20 dBc	Pass
	802.11(b) 11 Mbps				
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	-49.83 dBc	≤ -20 dBc	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	-59.78 dBc	≤ -20 dBc	Pass
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-48.77 dBc	≤ -20 dBc	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	-58.99 dBc	≤ -20 dBc	Pass
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-47.74 dBc	≤ -20 dBc	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	-58.54 dBc	≤ -20 dBc	Pass
	802.11(g) 6 Mbps				
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	-45.43 dBc	≤ -20 dBc	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	-49.84 dBc	≤ -20 dBc	Pass
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-46.32 dBc	≤ -20 dBc	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	-53.88 dBc	≤ -20 dBc	Pass
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-46.44 dBc	≤ -20 dBc	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	-50.9 dBc	≤ -20 dBc	Pass
	802.11(g) 36 Mbps				
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	-46.63 dBc	≤ -20 dBc	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	-50.71 dBc	≤ -20 dBc	Pass
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-47.35 dBc	≤ -20 dBc	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	-54 dBc	≤ -20 dBc	Pass
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-47.6 dBc	≤ -20 dBc	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	-51.77 dBc	≤ -20 dBc	Pass
	802.11(g) 54 Mbps				
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	-47.82 dBc	≤ -20 dBc	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	-50.61 dBc	≤ -20 dBc	Pass
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-48.66 dBc	≤ -20 dBc	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	-55.7 dBc	≤ -20 dBc	Pass
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-47.69 dBc	≤ -20 dBc	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	-53.01 dBc	≤ -20 dBc	Pass
5725 MHz - 5850 MHz Band					
	802.11(a) 6 Mbps				
	Low Channel 149, 5745 MHz	30 MHz - 12.5 GHz	-45.24 dBc	≤ -20 dBc	Pass
	Low Channel 149, 5745 MHz	12.5 GHz - 25 GHz	-44.96 dBc	≤ -20 dBc	Pass
	Low Channel 149, 5745 MHz	25 GHz - 32 GHz	-42.67 dBc	≤ -20 dBc	Pass
	Low Channel 149, 5745 MHz	32 GHz - 40 GHz	-33.14 dBc	≤ -20 dBc	Pass
	Mid Channel 157, 5785 MHz	30 MHz - 12.5 GHz	-43.79 dBc	≤ -20 dBc	Pass
	Mid Channel 157, 5785 MHz	12.5 GHz - 25 GHz	-44.71 dBc	≤ -20 dBc	Pass
	Mid Channel 157, 5785 MHz	25 GHz - 32 GHz	-41.78 dBc	≤ -20 dBc	Pass
	Mid Channel 157, 5785 MHz	32 GHz - 40 GHz	-32.28 dBc	≤ -20 dBc	Pass
	High Channel 165, 5825 MHz	30 MHz - 12.5 GHz	-46.32 dBc	≤ -20 dBc	Pass
	High Channel 165, 5825 MHz	12.5 GHz - 25 GHz	-44.29 dBc	≤ -20 dBc	Pass
	High Channel 165, 5825 MHz	25 GHz - 32 GHz	-41.5 dBc	≤ -20 dBc	Pass
	High Channel 165, 5825 MHz	32 GHz - 40 GHz	-32.33 dBc	≤ -20 dBc	Pass
	802.11(a) 36 Mbps				
	Low Channel 149, 5745 MHz	30 MHz - 12.5 GHz	-46.02 dBc	≤ -20 dBc	Pass
	Low Channel 149, 5745 MHz	12.5 GHz - 25 GHz	-46.82 dBc	≤ -20 dBc	Pass
	Low Channel 149, 5745 MHz	25 GHz - 32 GHz	-43.99 dBc	≤ -20 dBc	Pass
	Low Channel 149, 5745 MHz	32 GHz - 40 GHz	-34.52 dBc	≤ -20 dBc	Pass
	Mid Channel 157, 5785 MHz	30 MHz - 12.5 GHz	-45.19 dBc	≤ -20 dBc	Pass
	Mid Channel 157, 5785 MHz	12.5 GHz - 25 GHz	-45.97 dBc	≤ -20 dBc	Pass
	Mid Channel 157, 5785 MHz	25 GHz - 32 GHz	-42.64 dBc	≤ -20 dBc	Pass
	Mid Channel 157, 5785 MHz	32 GHz - 40 GHz	-33.76 dBc	≤ -20 dBc	Pass
	High Channel 165, 5825 MHz	30 MHz - 12.5 GHz	-47.29 dBc	≤ -20 dBc	Pass
	High Channel 165, 5825 MHz	12.5 GHz - 25 GHz	-45.56 dBc	≤ -20 dBc	Pass
	High Channel 165, 5825 MHz	25 GHz - 32 GHz	-42.42 dBc	≤ -20 dBc	Pass
	High Channel 165, 5825 MHz	32 GHz - 40 GHz	-32.59 dBc	≤ -20 dBc	Pass
	802.11(a) 54 Mbps				
	Low Channel 149, 5745 MHz	30 MHz - 12.5 GHz	-47.56 dBc	≤ -20 dBc	Pass
	Low Channel 149, 5745 MHz	12.5 GHz - 25 GHz	-47.23 dBc	≤ -20 dBc	Pass
	Low Channel 149, 5745 MHz	25 GHz - 32 GHz	-45.32 dBc	≤ -20 dBc	Pass
	Low Channel 149, 5745 MHz	32 GHz - 40 GHz	-35.12 dBc	≤ -20 dBc	Pass
	Mid Channel 157, 5785 MHz	30 MHz - 12.5 GHz	-46.39 dBc	≤ -20 dBc	Pass
	Mid Channel 157, 5785 MHz	12.5 GHz - 25 GHz	-46.73 dBc	≤ -20 dBc	Pass
	Mid Channel 157, 5785 MHz	25 GHz - 32 GHz	-43.53 dBc	≤ -20 dBc	Pass
	Mid Channel 157, 5785 MHz	32 GHz - 40 GHz	-34.54 dBc	≤ -20 dBc	Pass
	High Channel 165, 5825 MHz	30 MHz - 12.5 GHz	-49.23 dBc	≤ -20 dBc	Pass
	High Channel 165, 5825 MHz	12.5 GHz - 25 GHz	-46.12 dBc	≤ -20 dBc	Pass
	High Channel 165, 5825 MHz	25 GHz - 32 GHz	-43.08 dBc	≤ -20 dBc	Pass
	High Channel 165, 5825 MHz	32 GHz - 40 GHz	-33.96 dBc	≤ -20 dBc	Pass

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-50.23 dBc	≤ -20 dBc	Pass

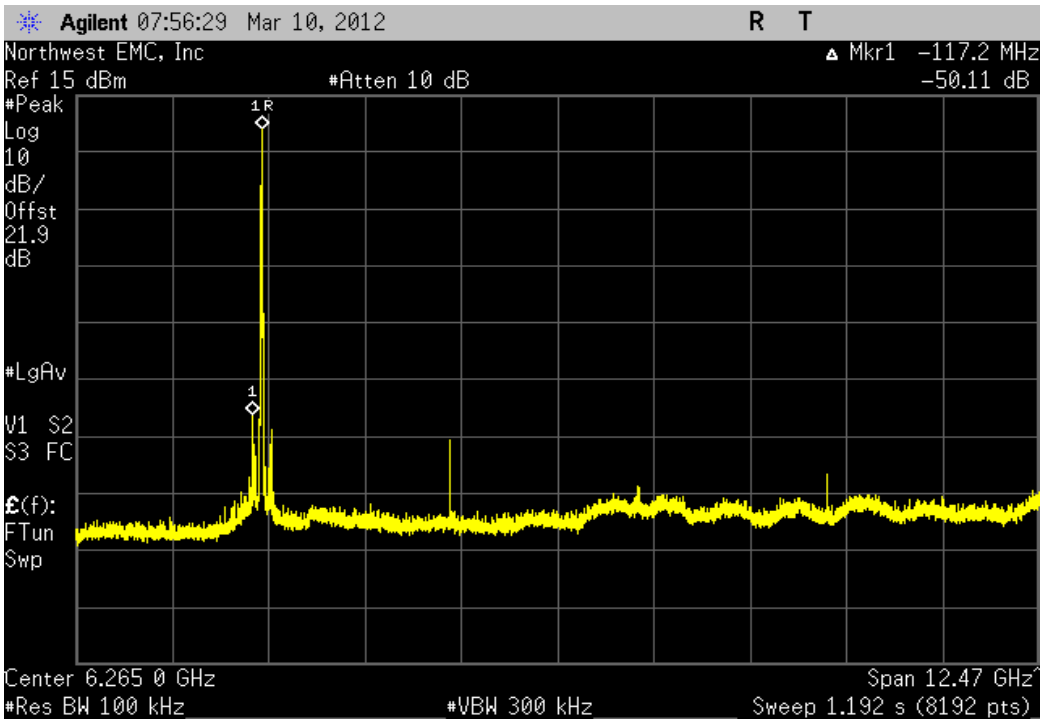


2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-59.58 dBc	≤ -20 dBc	Pass

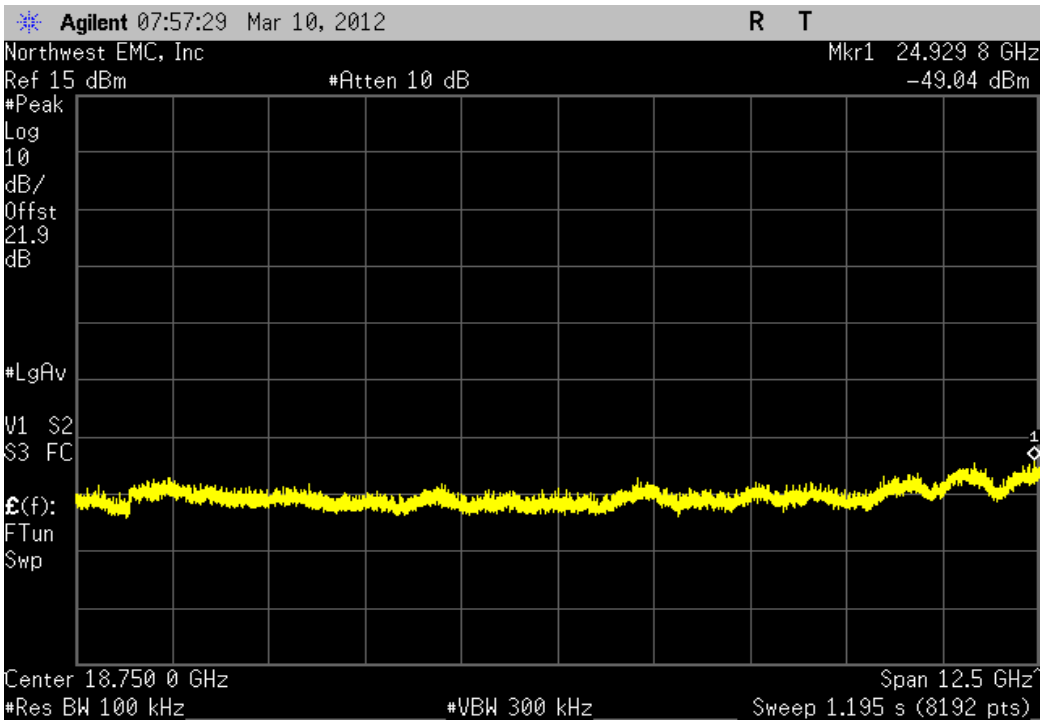


Spurious Conducted Emissions

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-50.11 dBc	≤ -20 dBc	Pass

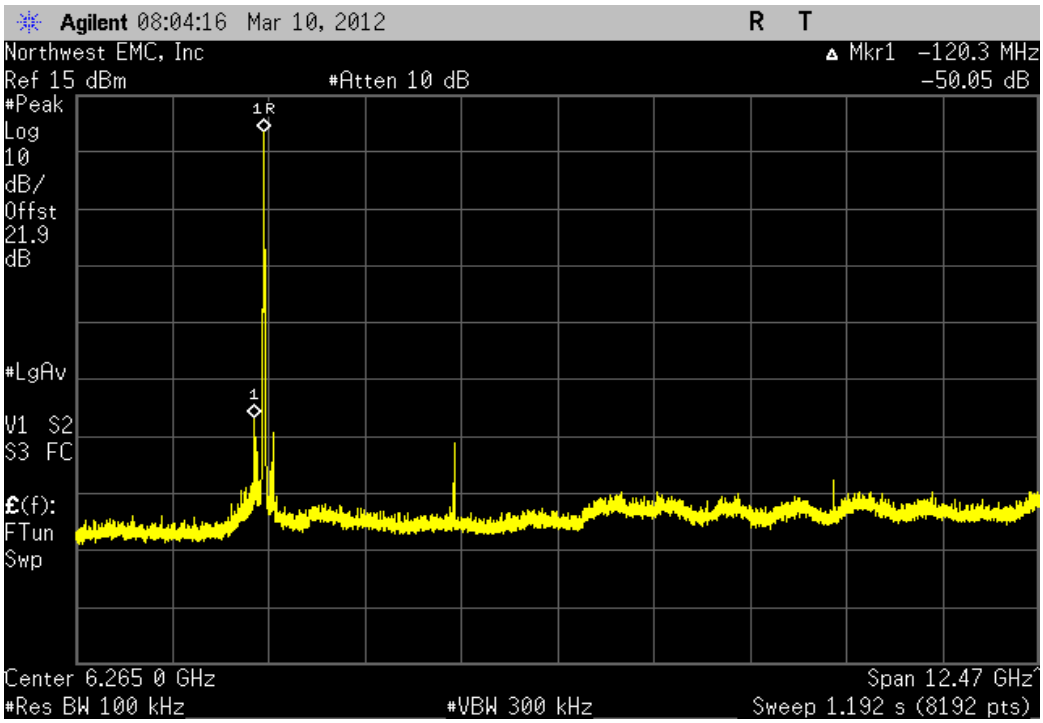


2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-57.98 dBc	≤ -20 dBc	Pass

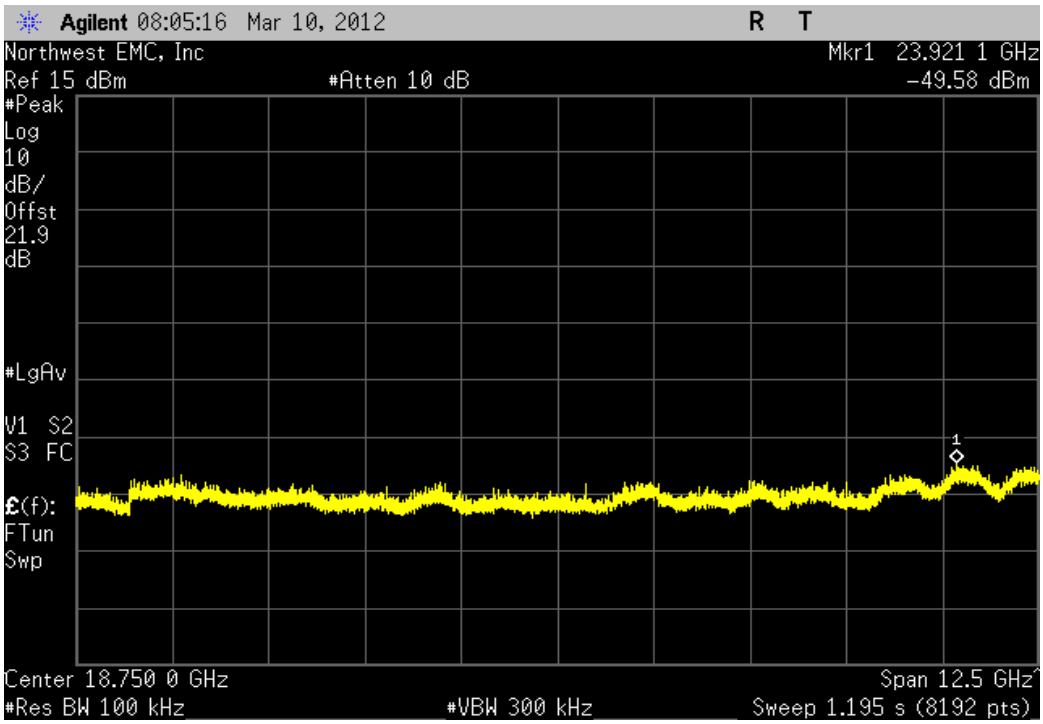


Spurious Conducted Emissions

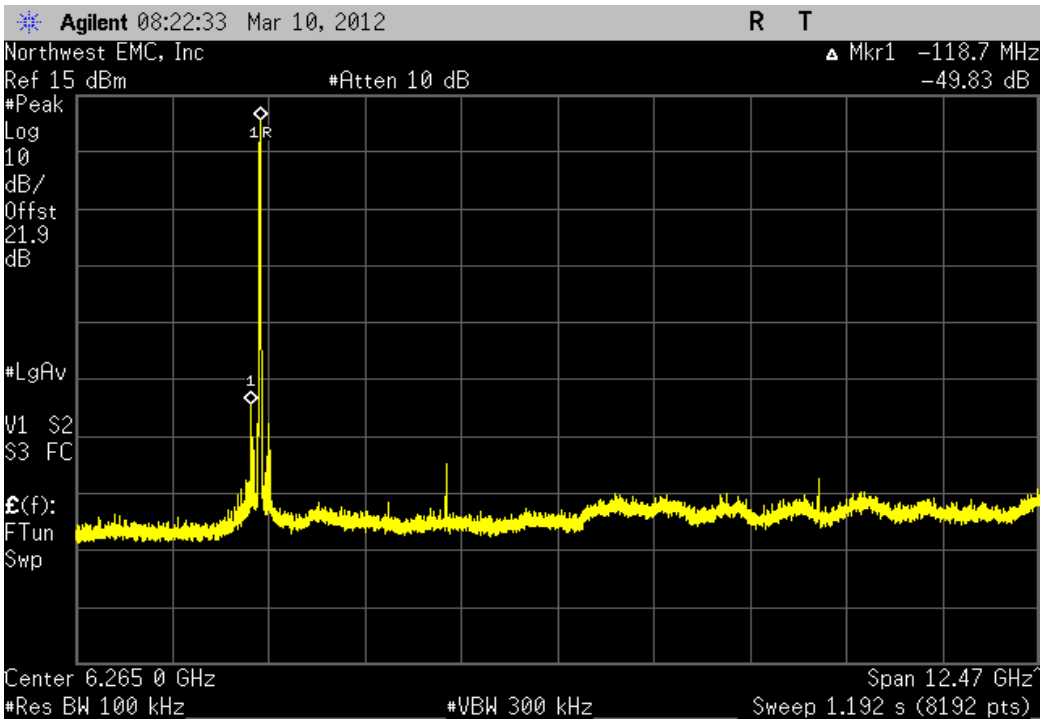
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-50.05 dBc	≤ -20 dBc	Pass



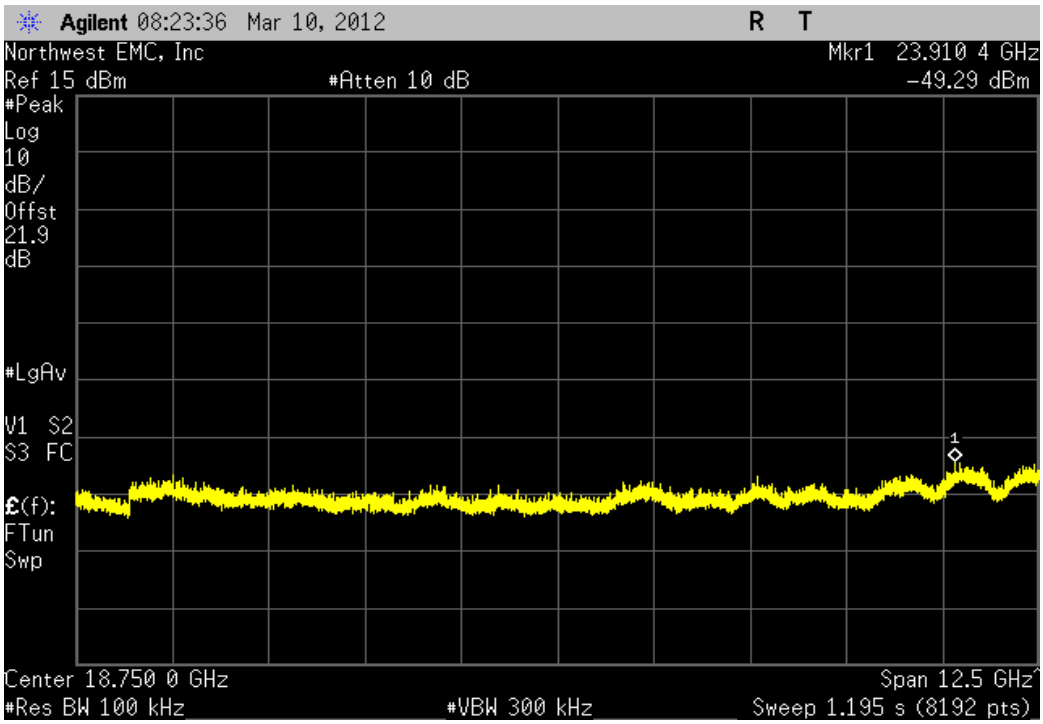
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-57.99 dBc	≤ -20 dBc	Pass



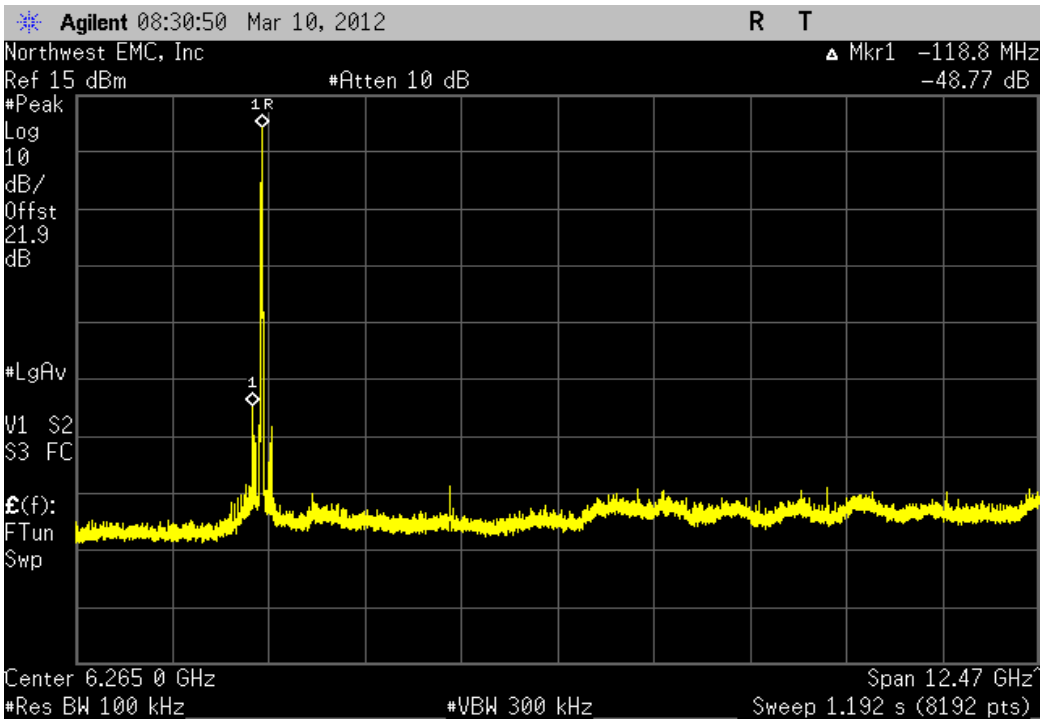
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-49.83 dBc	≤ -20 dBc	Pass



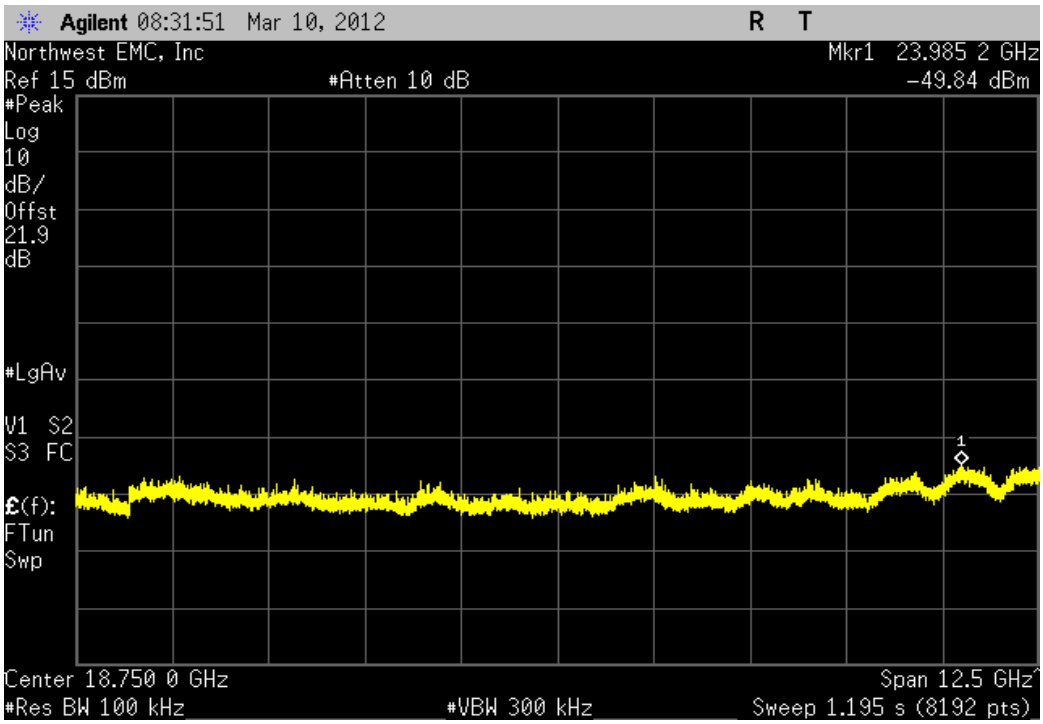
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-59.78 dBc	≤ -20 dBc	Pass



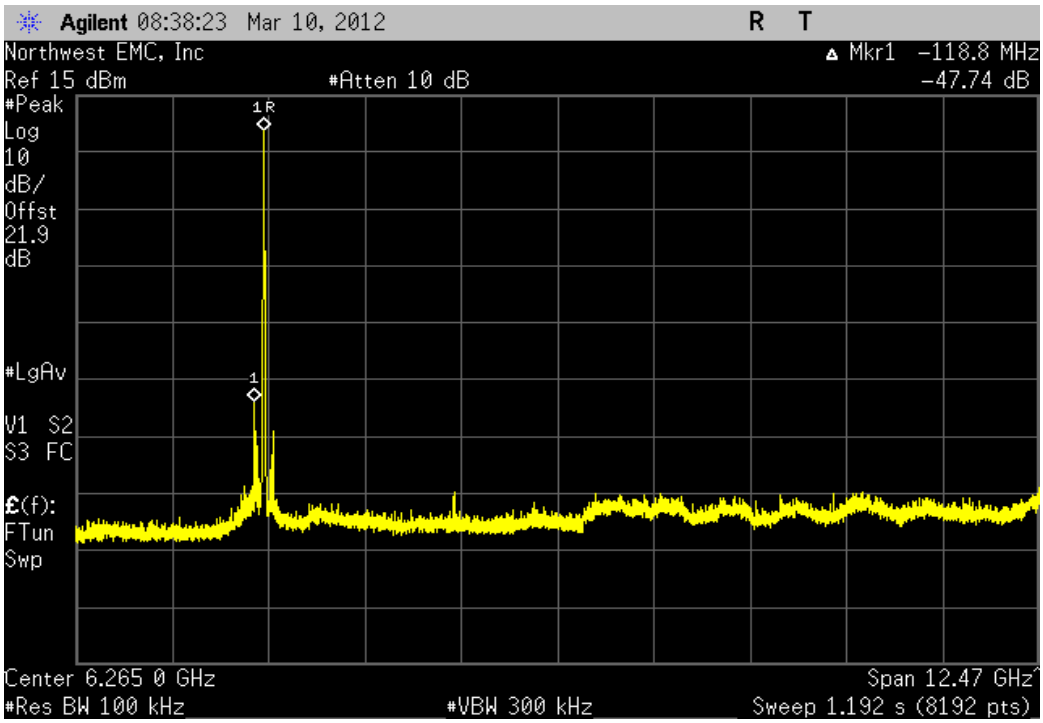
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-48.77 dBc	≤ -20 dBc	Pass



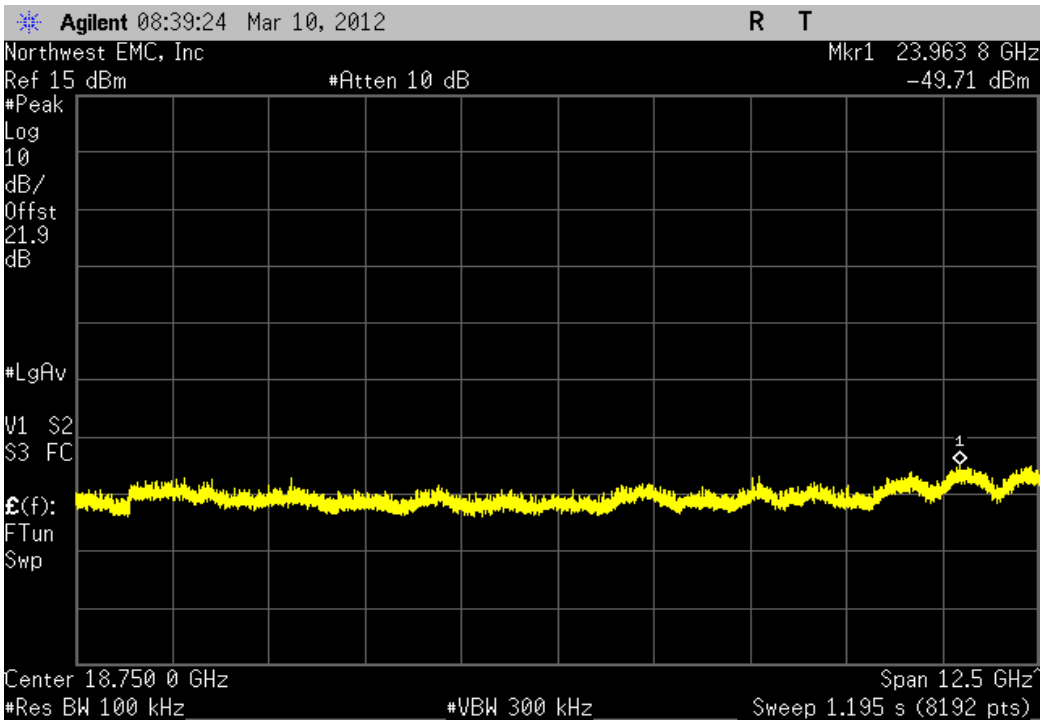
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-58.99 dBc	≤ -20 dBc	Pass



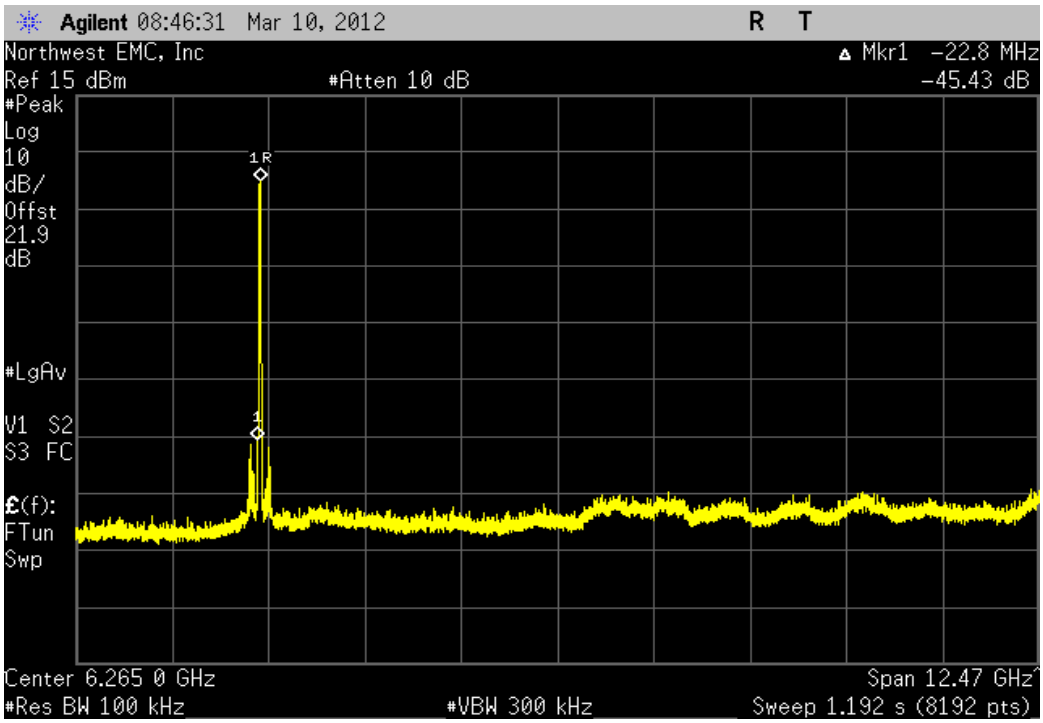
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-47.74 dBc	≤ -20 dBc	Pass



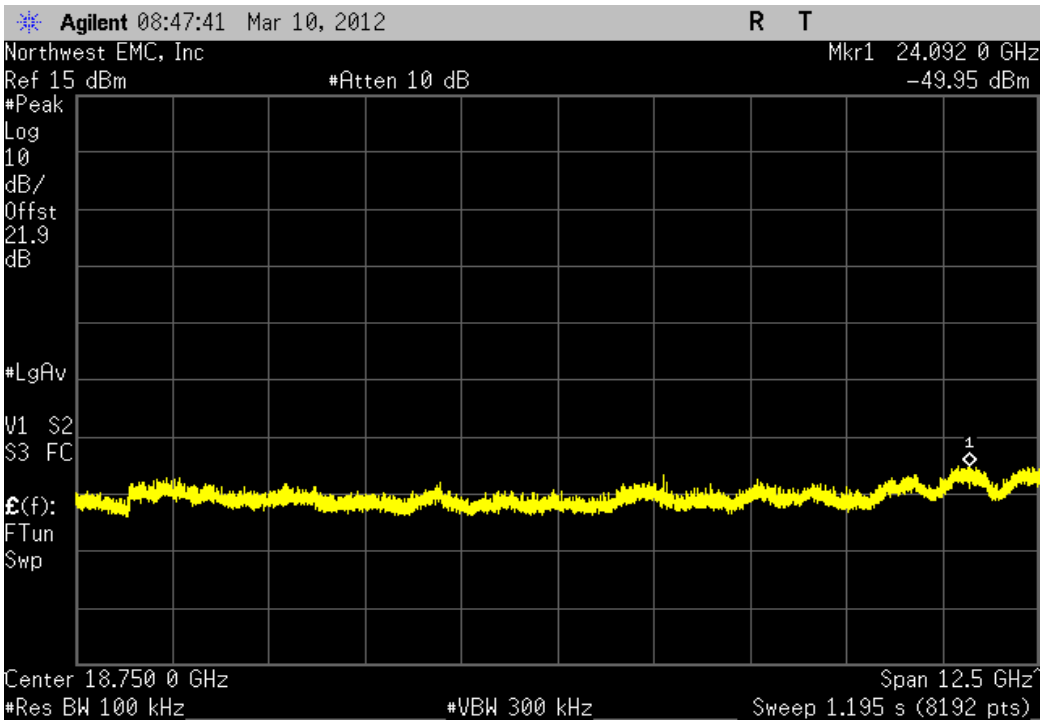
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-58.54 dBc	≤ -20 dBc	Pass



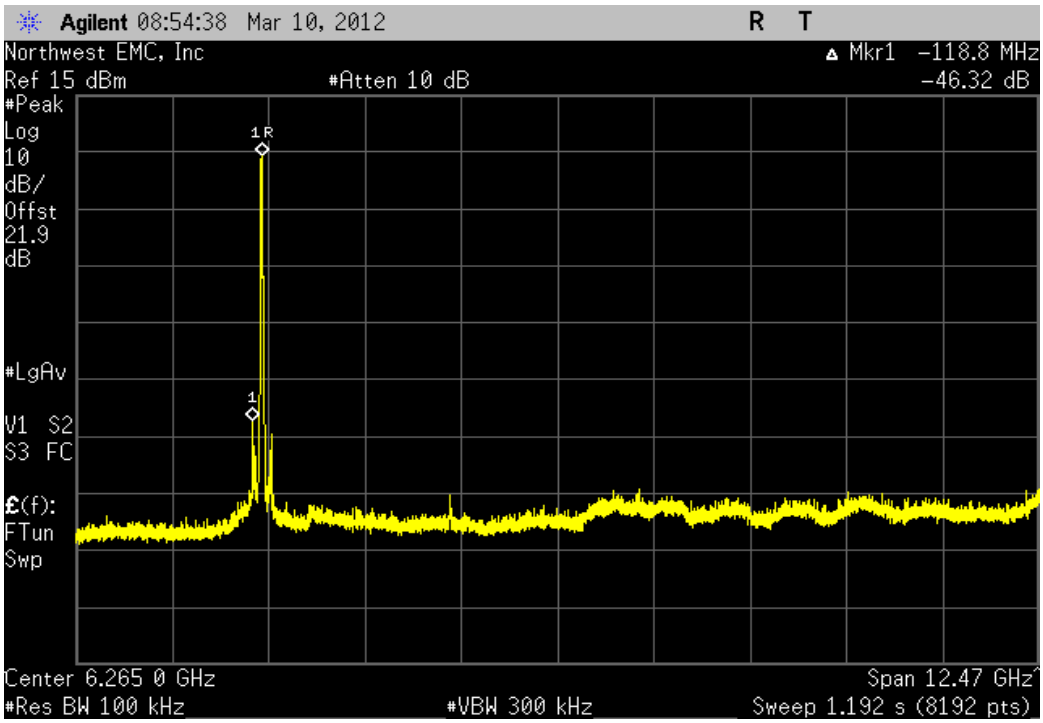
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-45.43 dBc	≤ -20 dBc	Pass



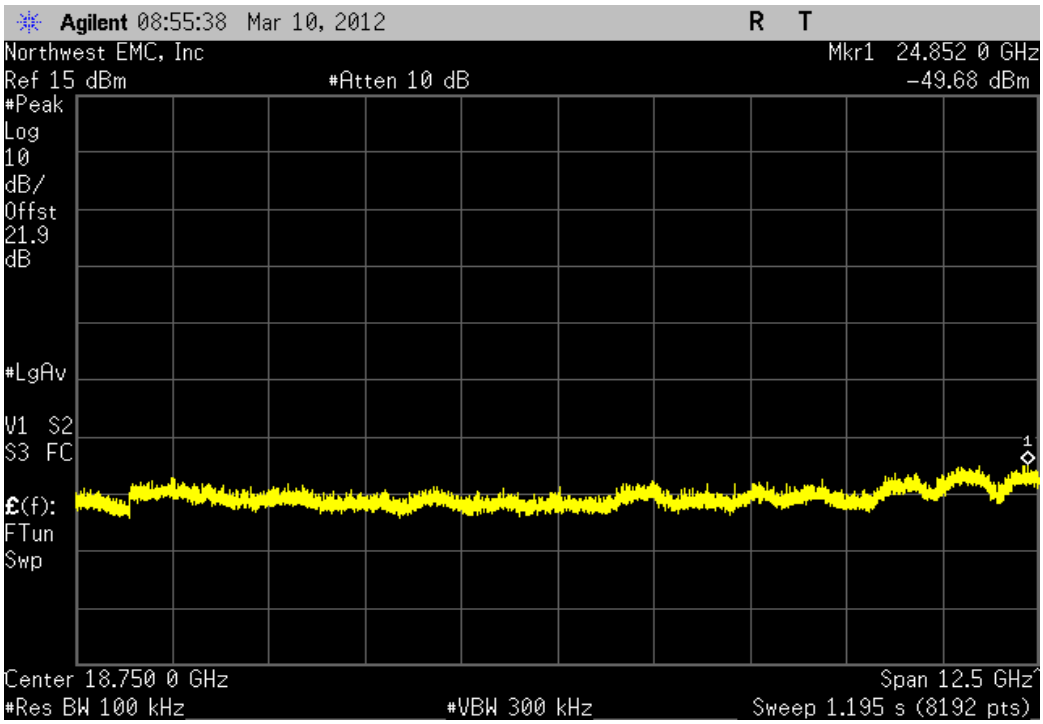
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-49.84 dBc	≤ -20 dBc	Pass



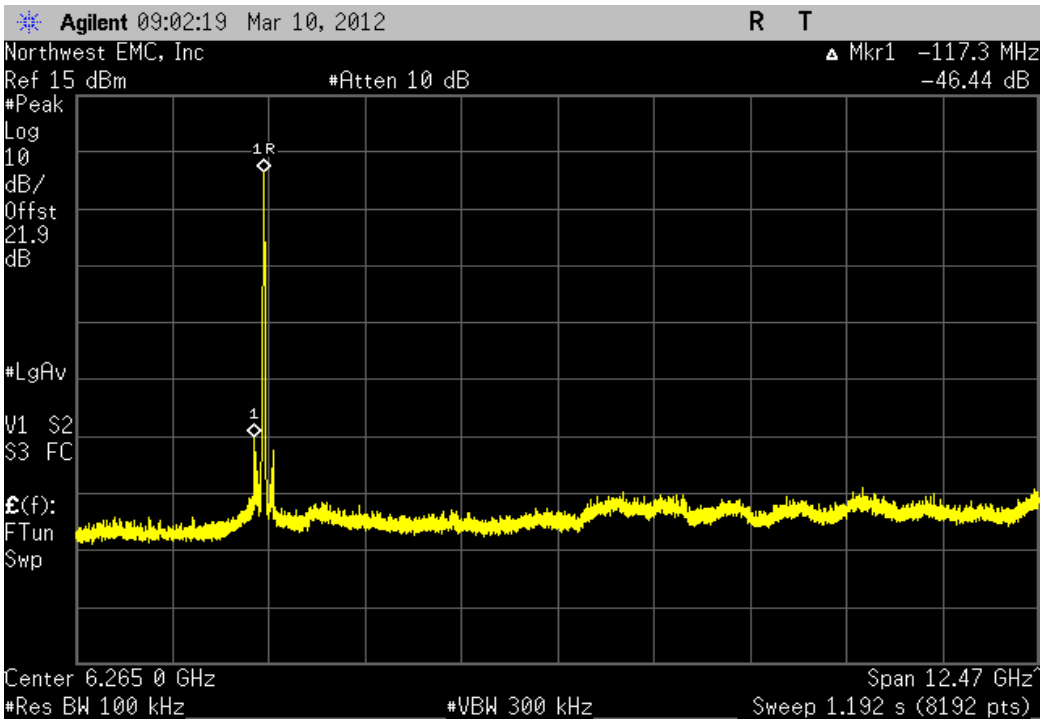
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-46.32 dBc	≤ -20 dBc	Pass



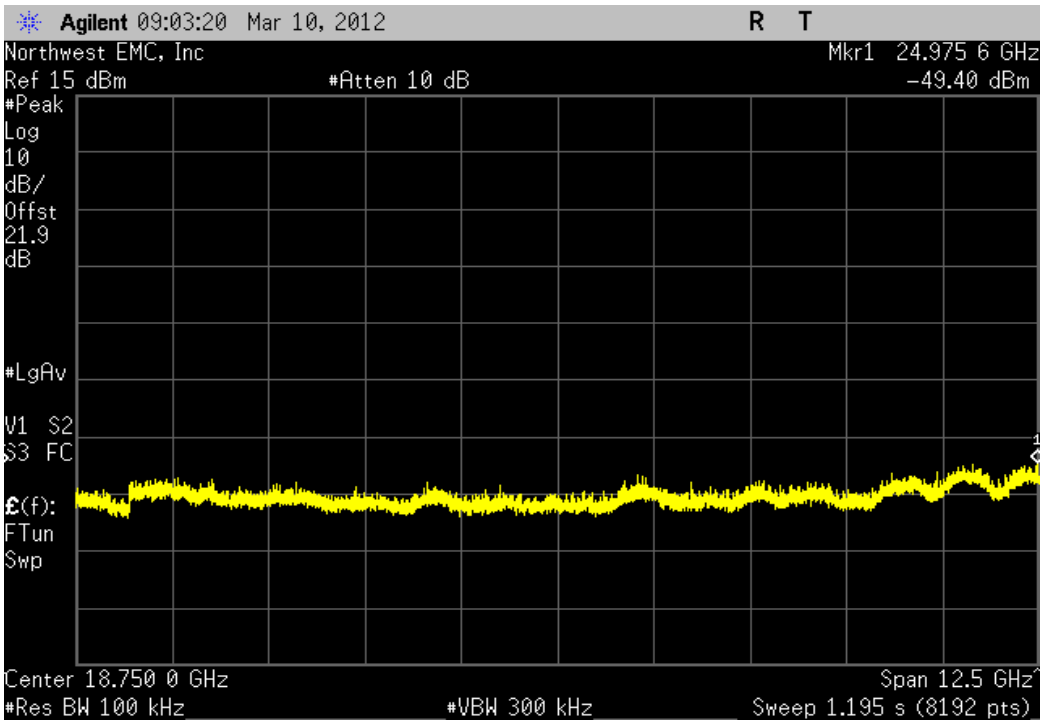
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-53.88 dBc	≤ -20 dBc	Pass



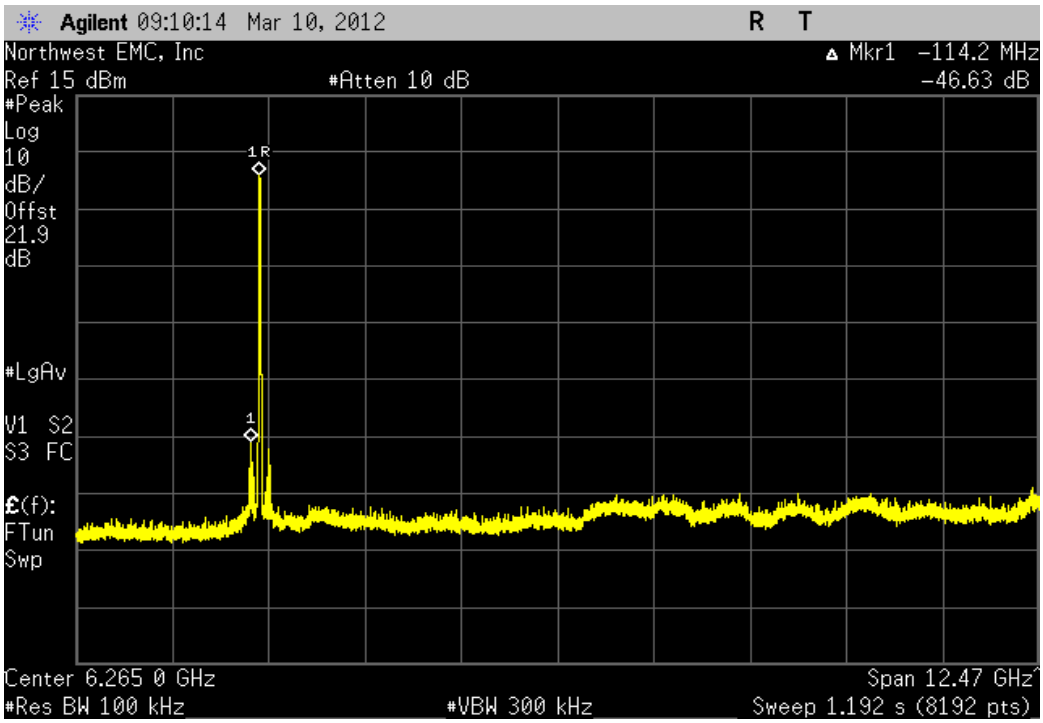
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-46.44 dBc	≤ -20 dBc	Pass



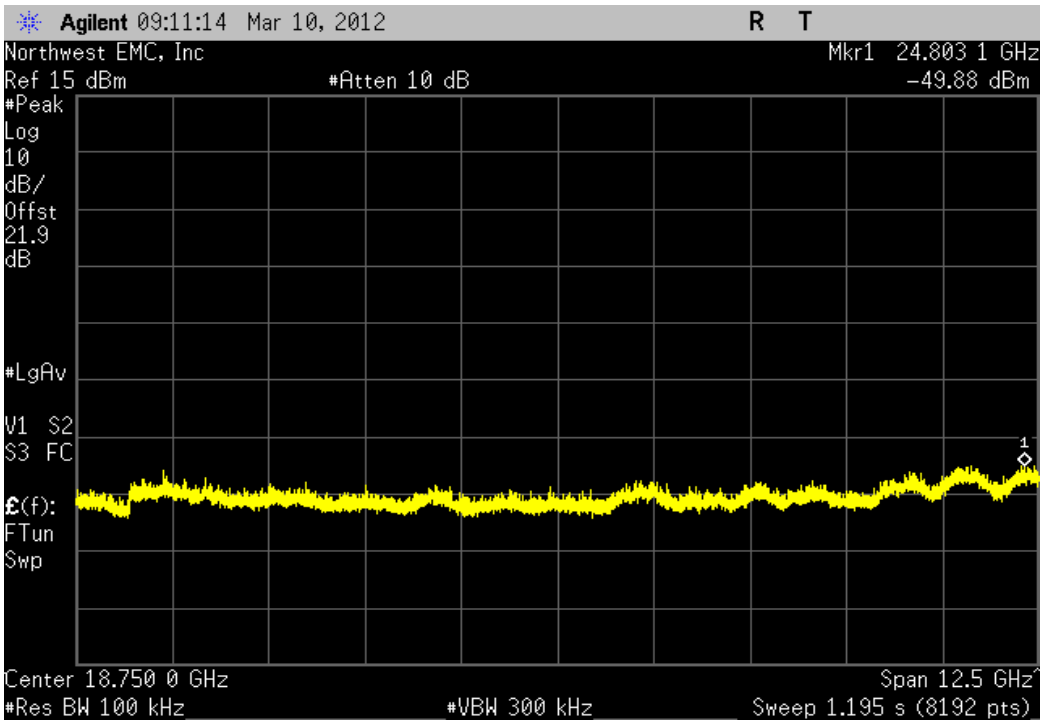
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-50.9 dBc	≤ -20 dBc	Pass



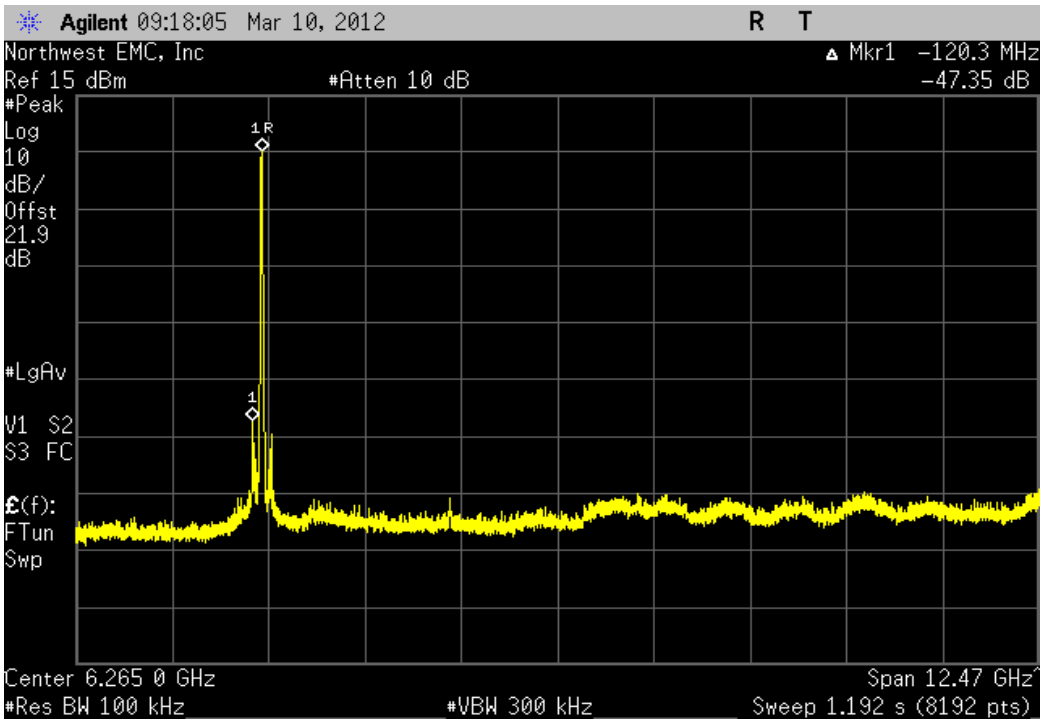
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-46.63 dBc	≤ -20 dBc	Pass



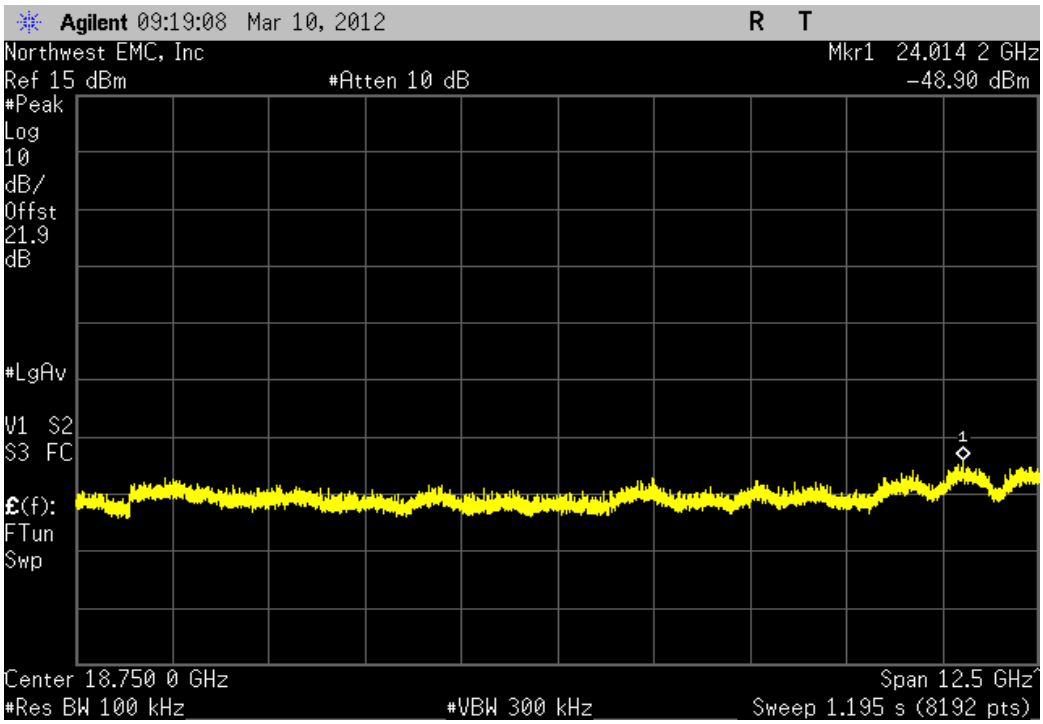
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-50.71 dBc	≤ -20 dBc	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-47.35 dBc	≤ -20 dBc	Pass

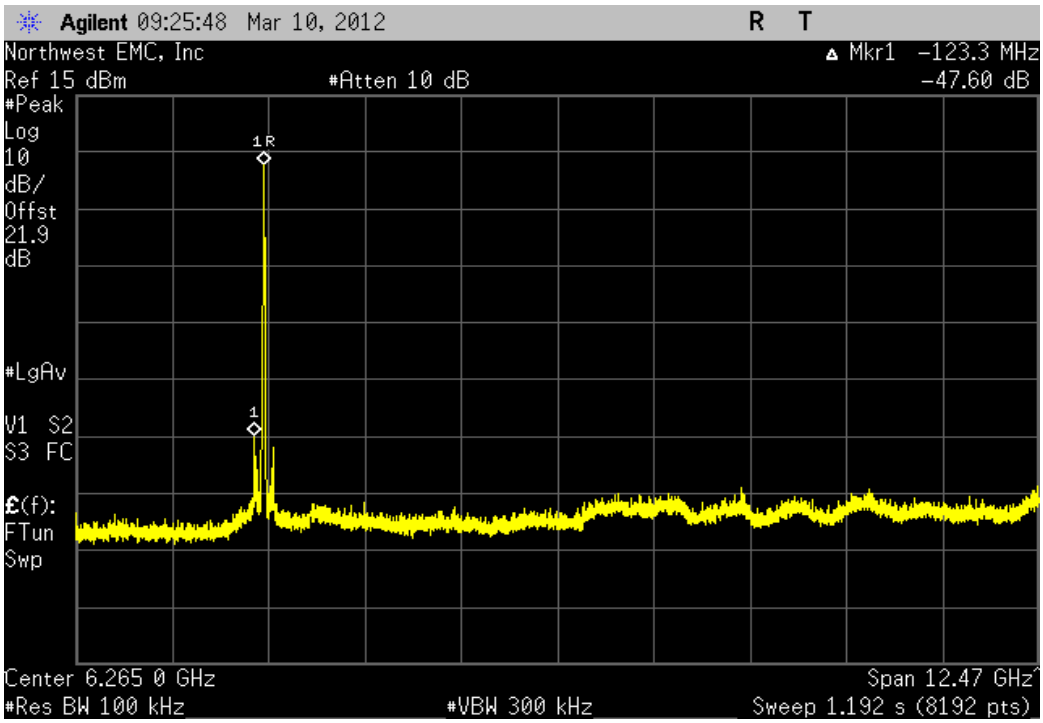


2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-54 dBc	≤ -20 dBc	Pass

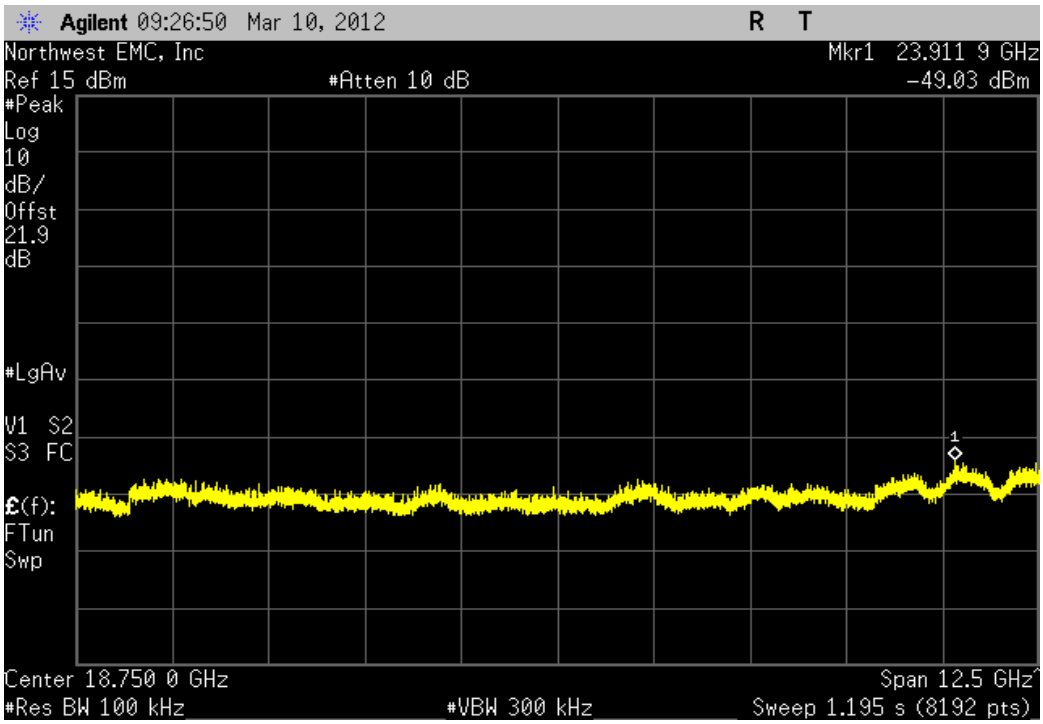


Spurious Conducted Emissions

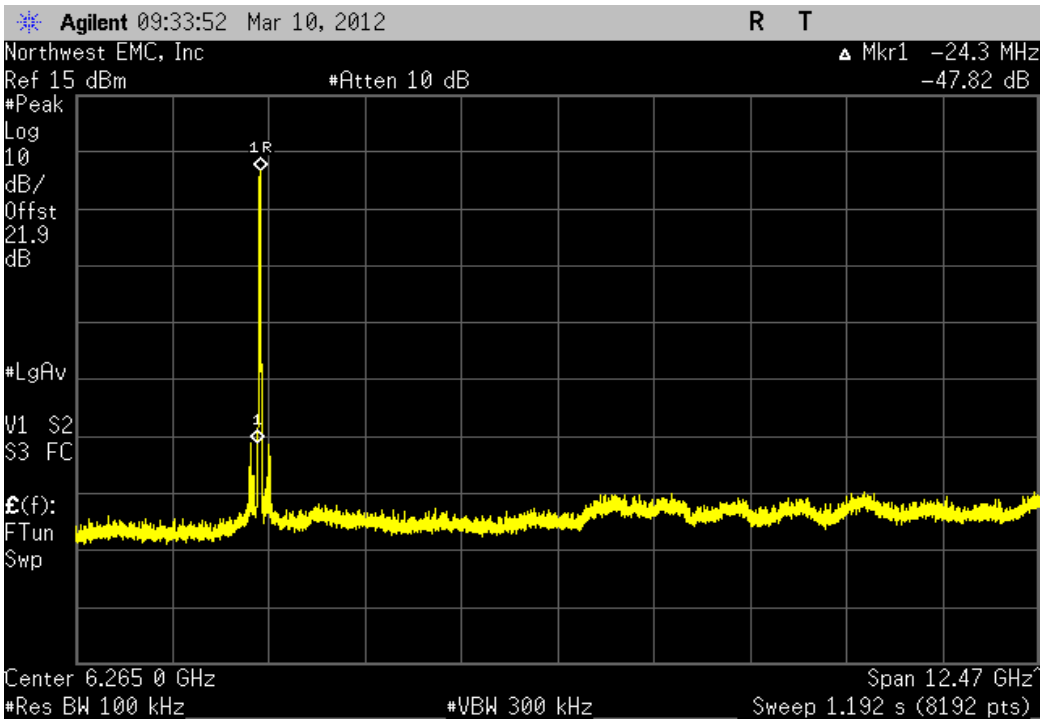
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-47.6 dBc	≤ -20 dBc	Pass



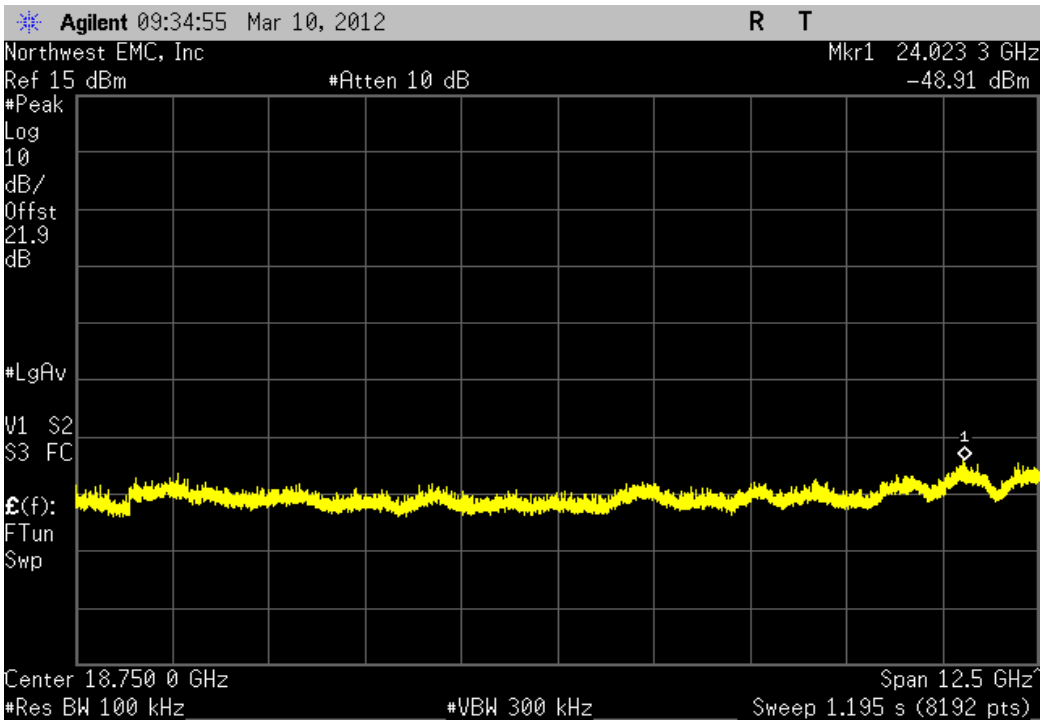
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-51.77 dBc	≤ -20 dBc	Pass



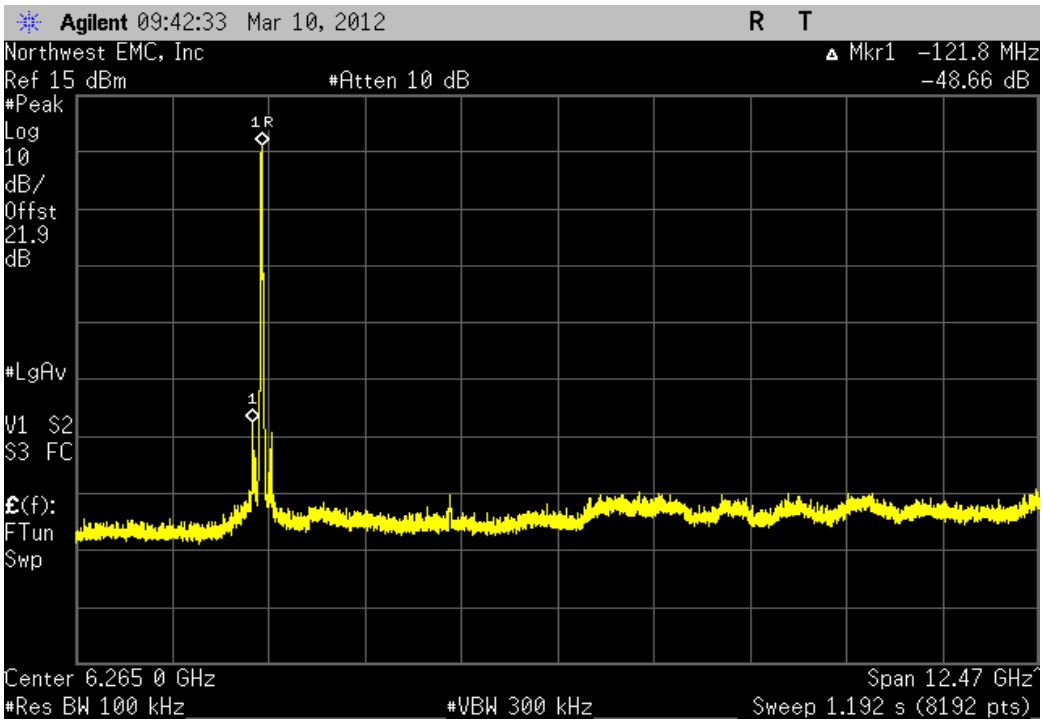
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-47.82 dBc	≤ -20 dBc	Pass



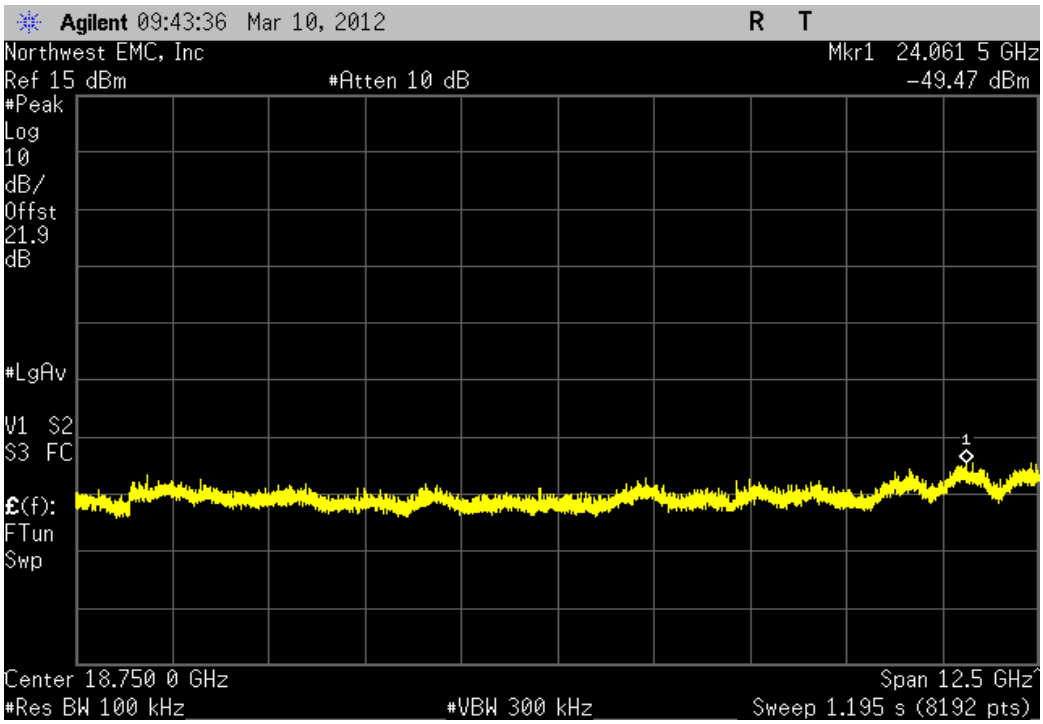
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-50.61 dBc	≤ -20 dBc	Pass



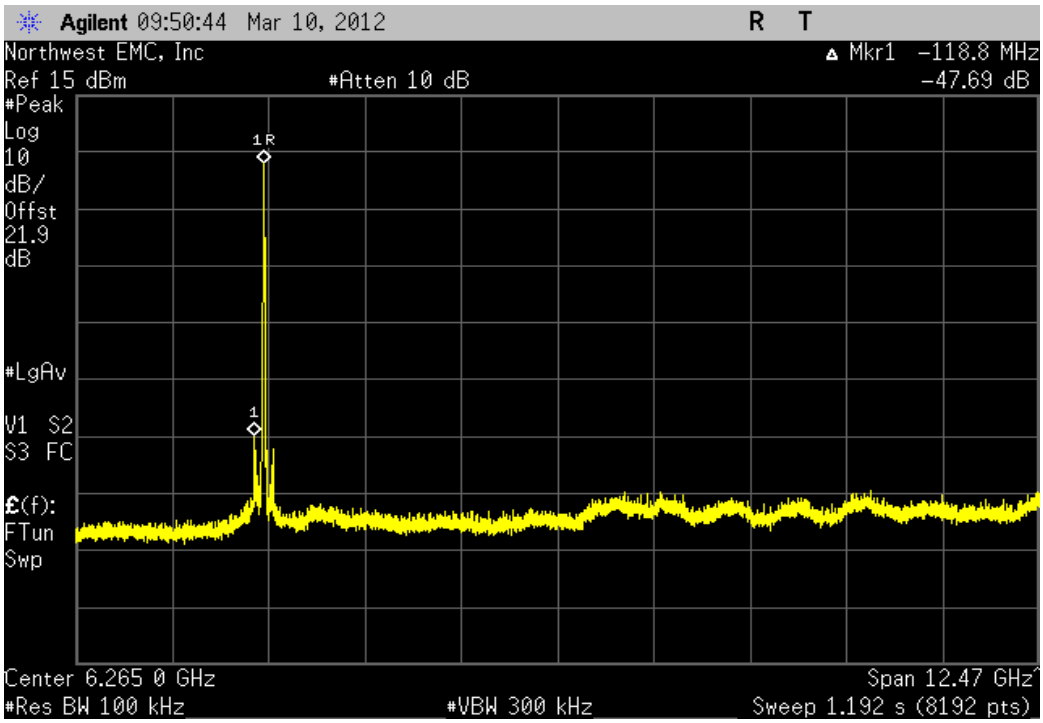
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-48.66 dBc	≤ -20 dBc	Pass



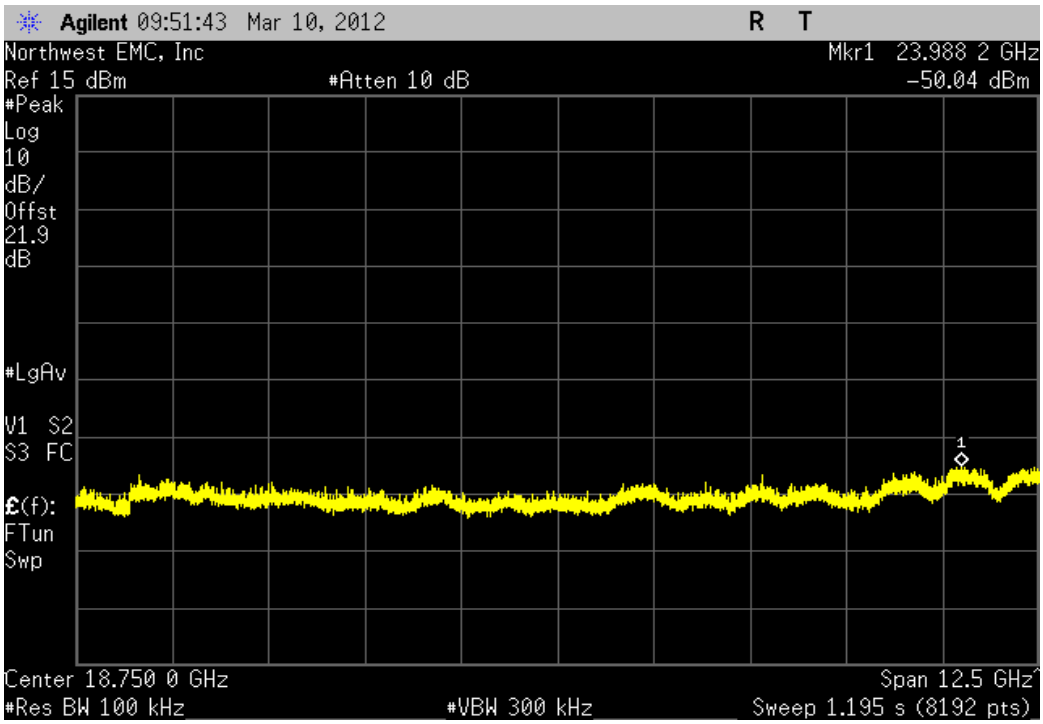
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-55.7 dBc	≤ -20 dBc	Pass



2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-47.69 dBc	≤ -20 dBc	Pass

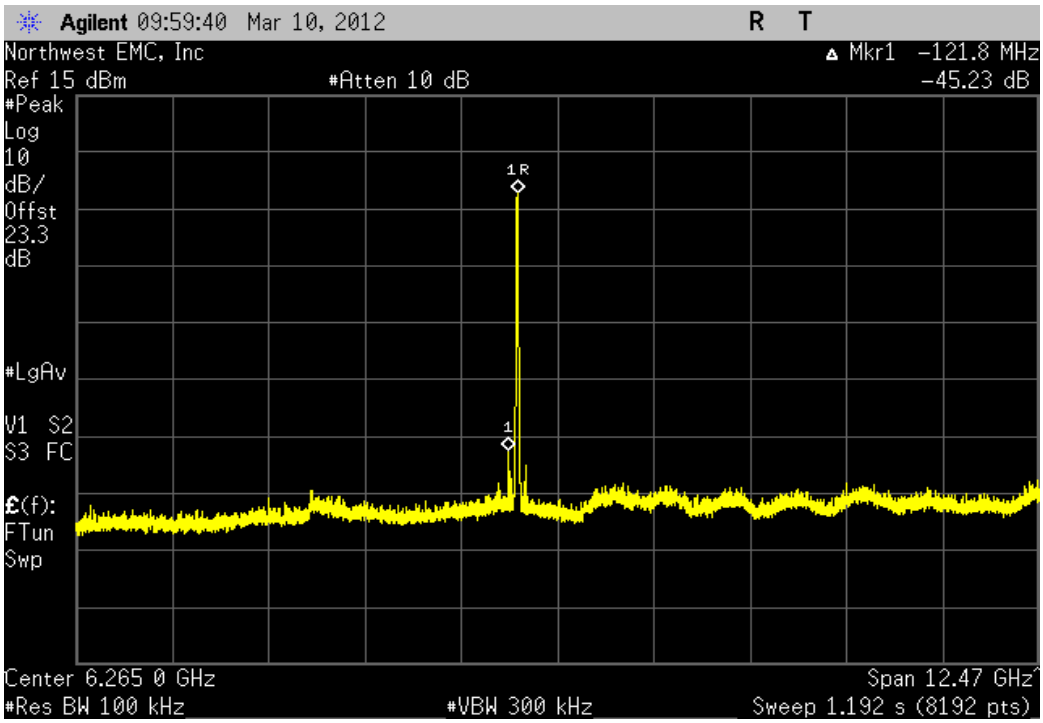


2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-53.01 dBc	≤ -20 dBc	Pass

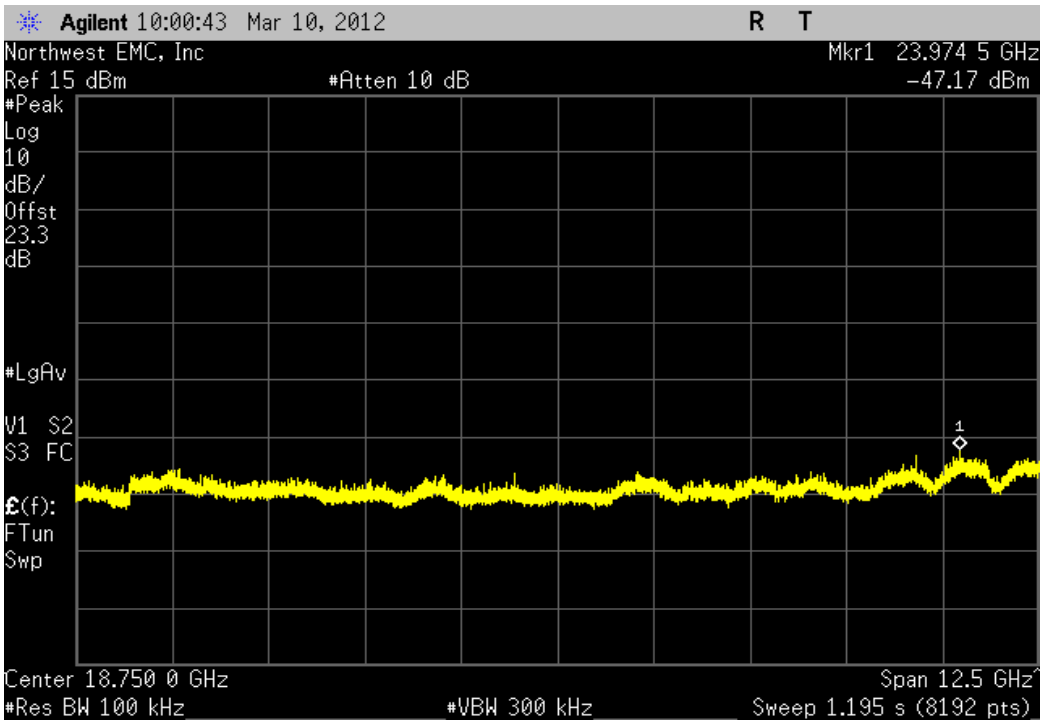


Spurious Conducted Emissions

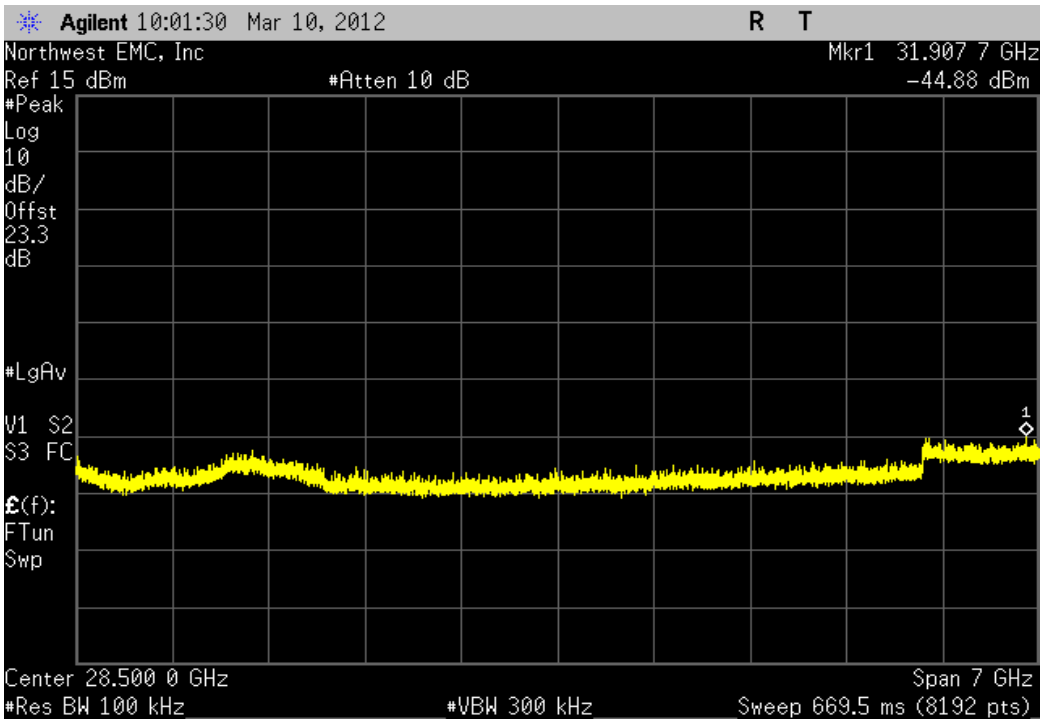
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Low Channel 149, 5745 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-45.24 dBc	≤ -20 dBc	Pass



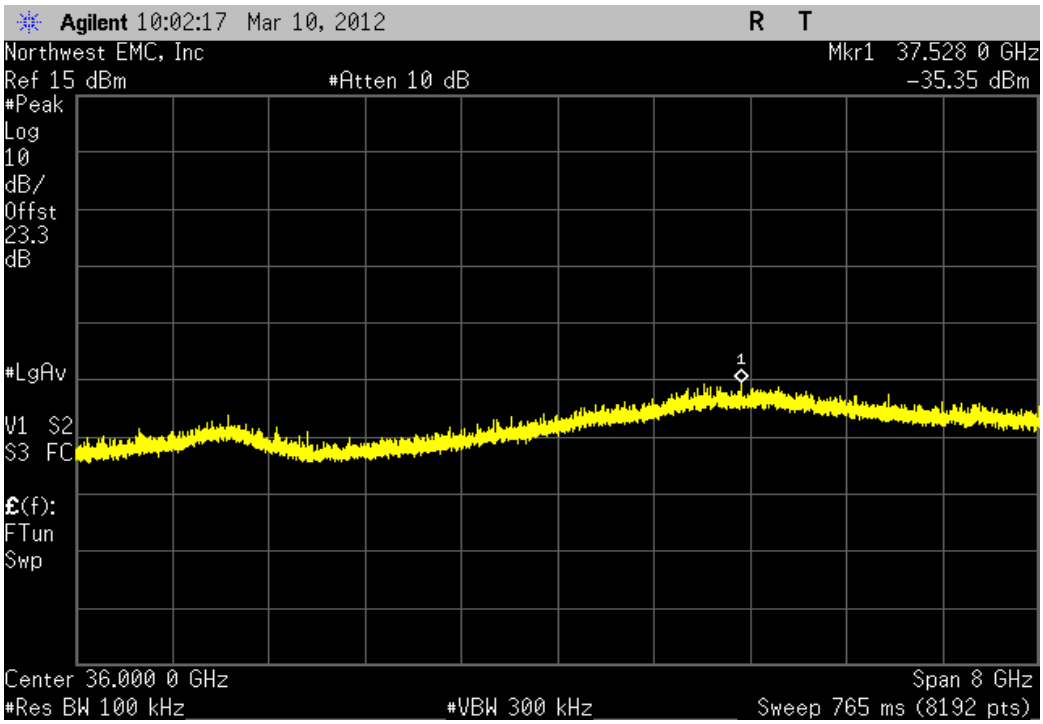
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Low Channel 149, 5745 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-44.96 dBc	≤ -20 dBc	Pass



5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Low Channel 149, 5745 MHz				
Frequency Range		**Value**	**Limit**	**Result**
25 GHz - 32 GHz		-42.67 dBc	≤ -20 dBc	Pass

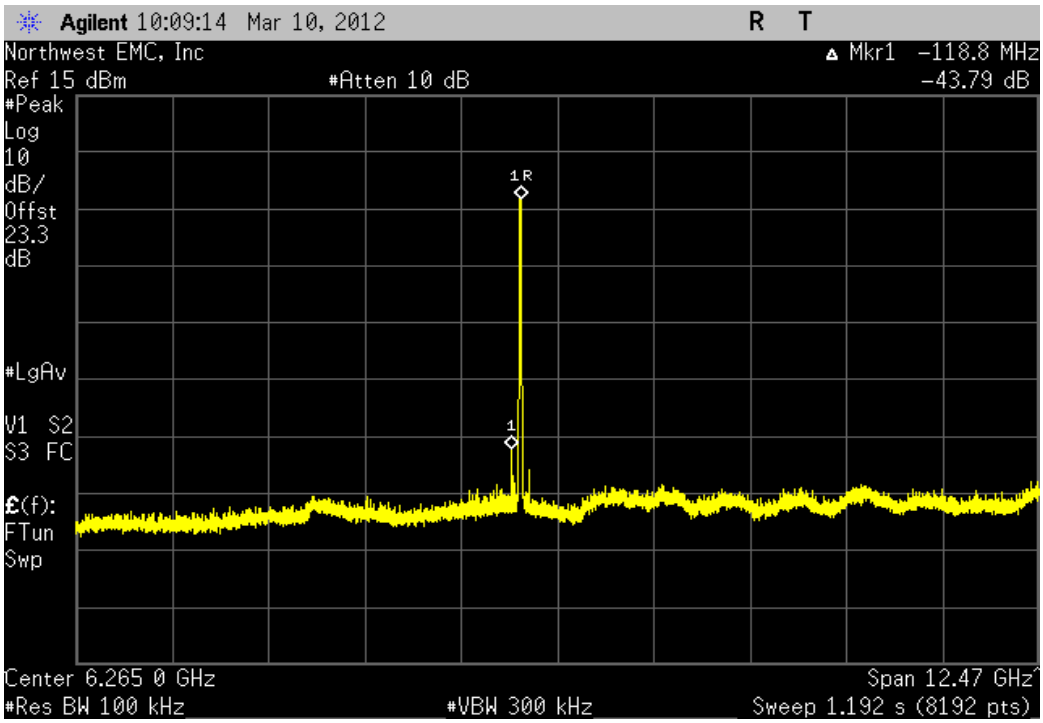


5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Low Channel 149, 5745 MHz				
Frequency Range		**Value**	**Limit**	**Result**
32 GHz - 40 GHz		-33.14 dBc	≤ -20 dBc	Pass

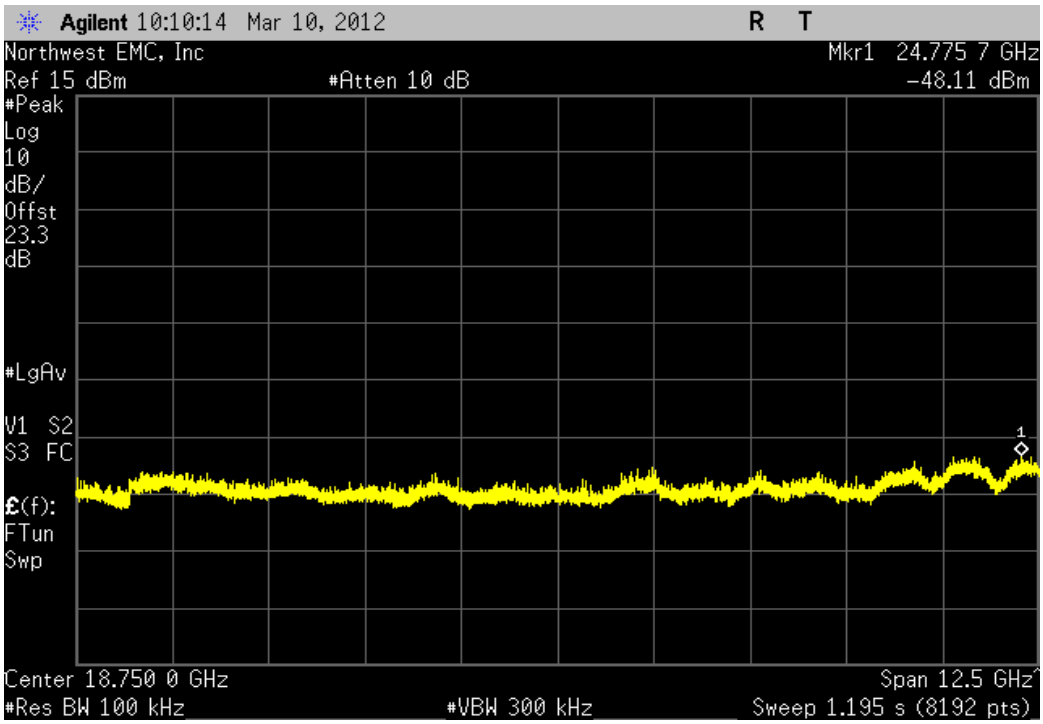


Spurious Conducted Emissions

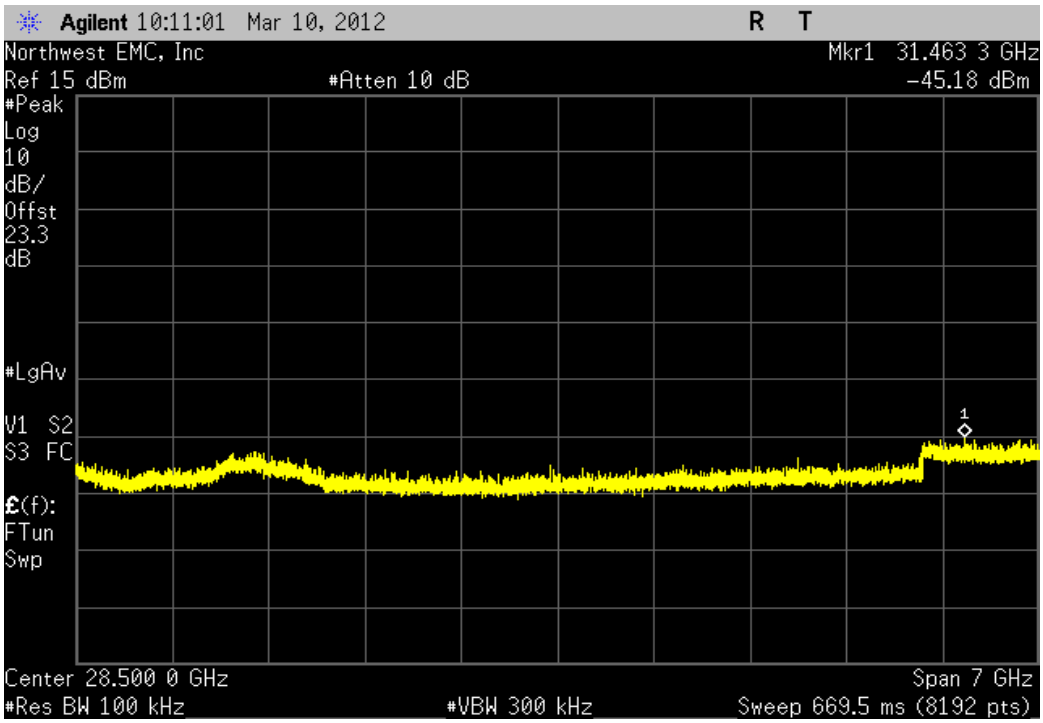
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Mid Channel 157, 5785 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-43.79 dBc	≤ -20 dBc	Pass



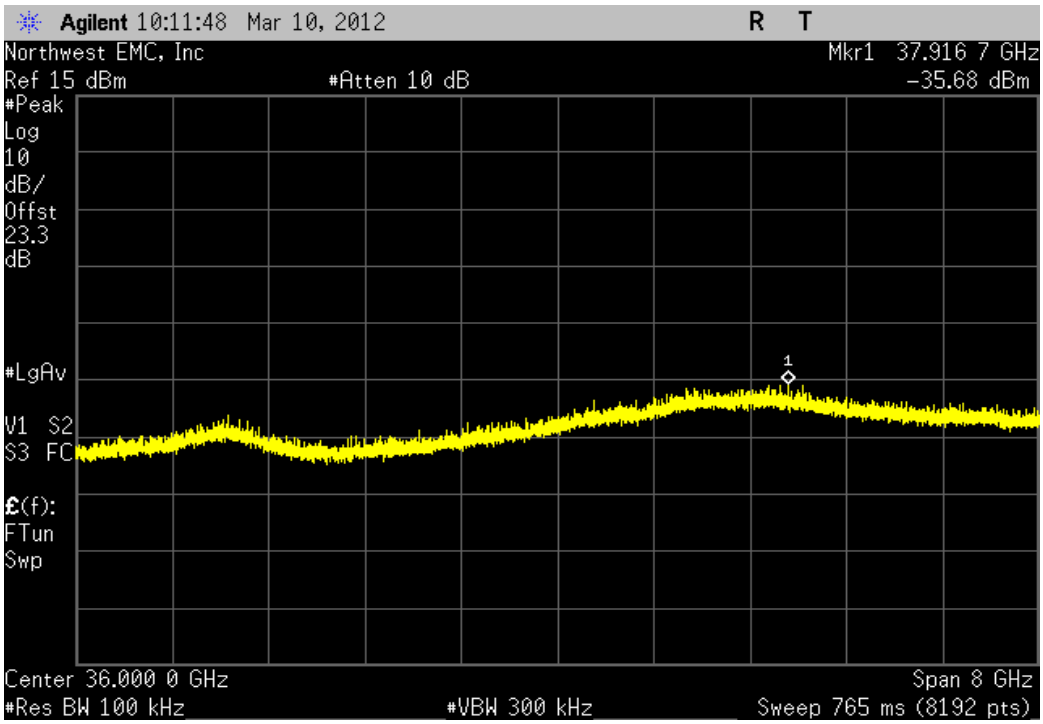
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Mid Channel 157, 5785 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-44.71 dBc	≤ -20 dBc	Pass



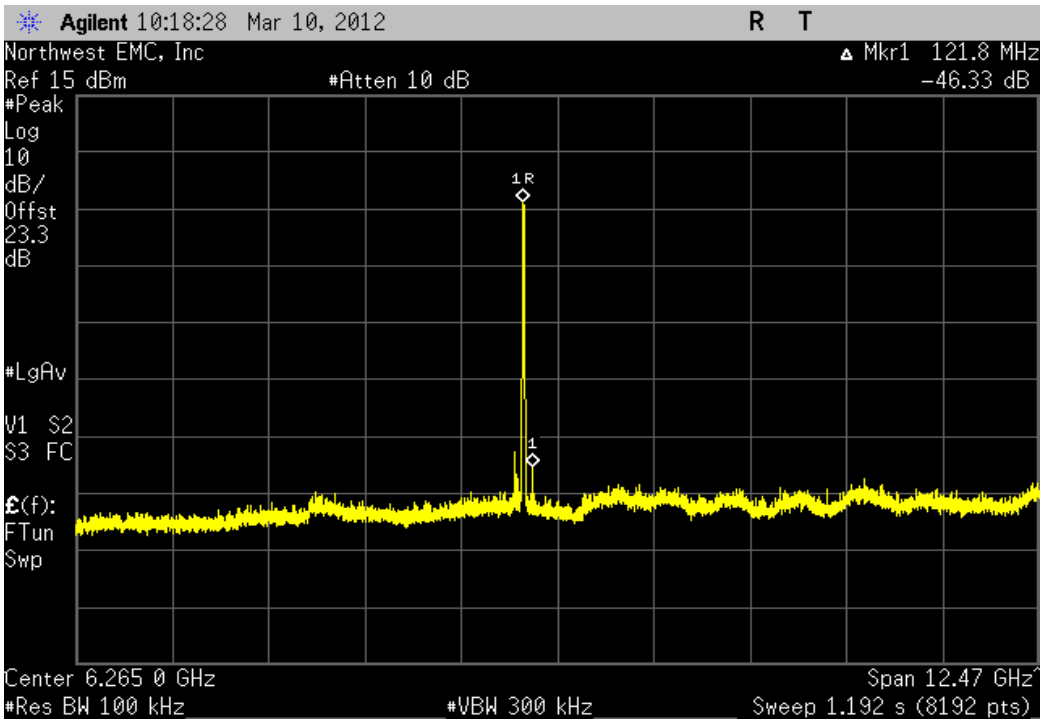
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Mid Channel 157, 5785 MHz				
Frequency Range		**Value**	**Limit**	**Result**
25 GHz - 32 GHz		-41.78 dBc	≤ -20 dBc	Pass



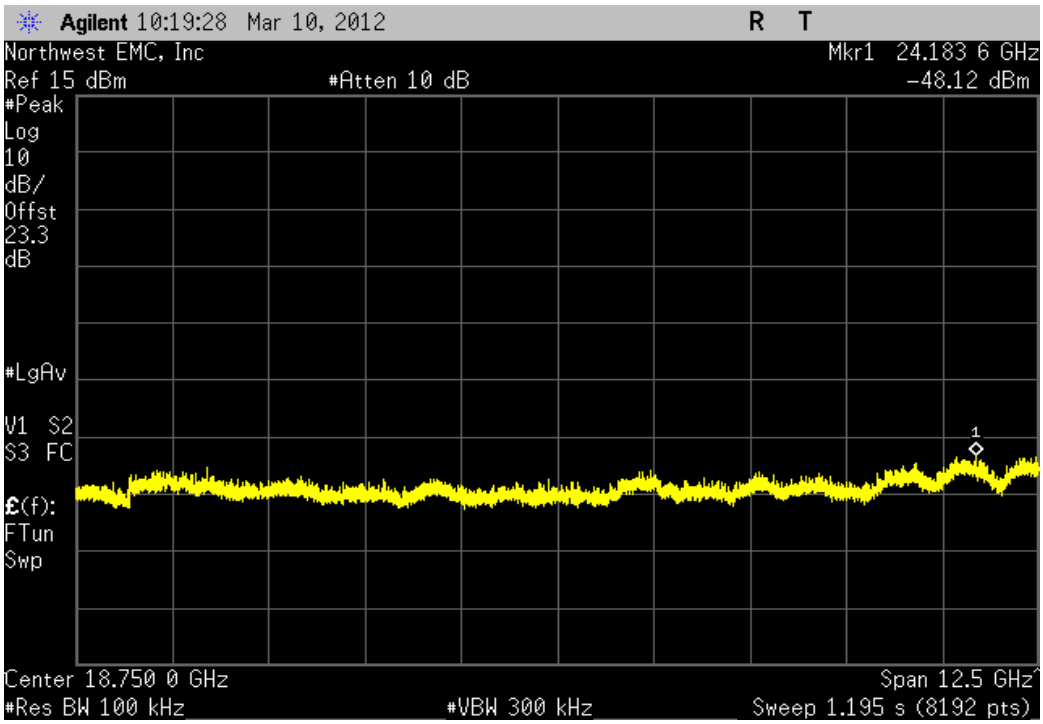
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Mid Channel 157, 5785 MHz				
Frequency Range		**Value**	**Limit**	**Result**
32 GHz - 40 GHz		-32.28 dBc	≤ -20 dBc	Pass



5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, High Channel 165, 5825 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-46.32 dBc	≤ -20 dBc	Pass

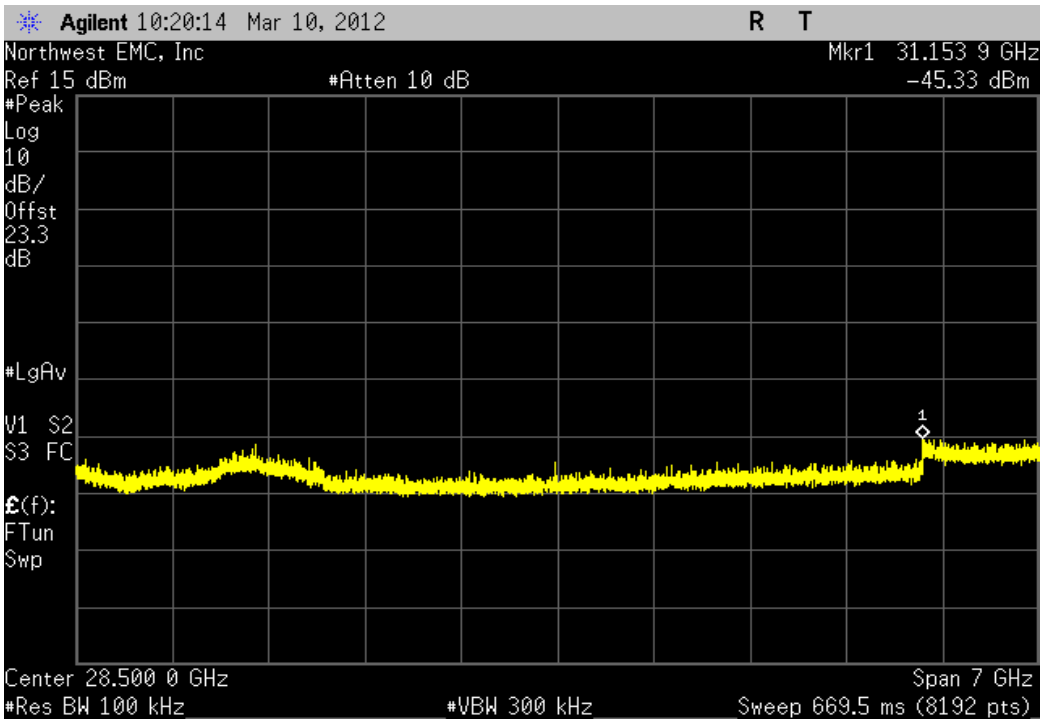


5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, High Channel 165, 5825 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-44.29 dBc	≤ -20 dBc	Pass

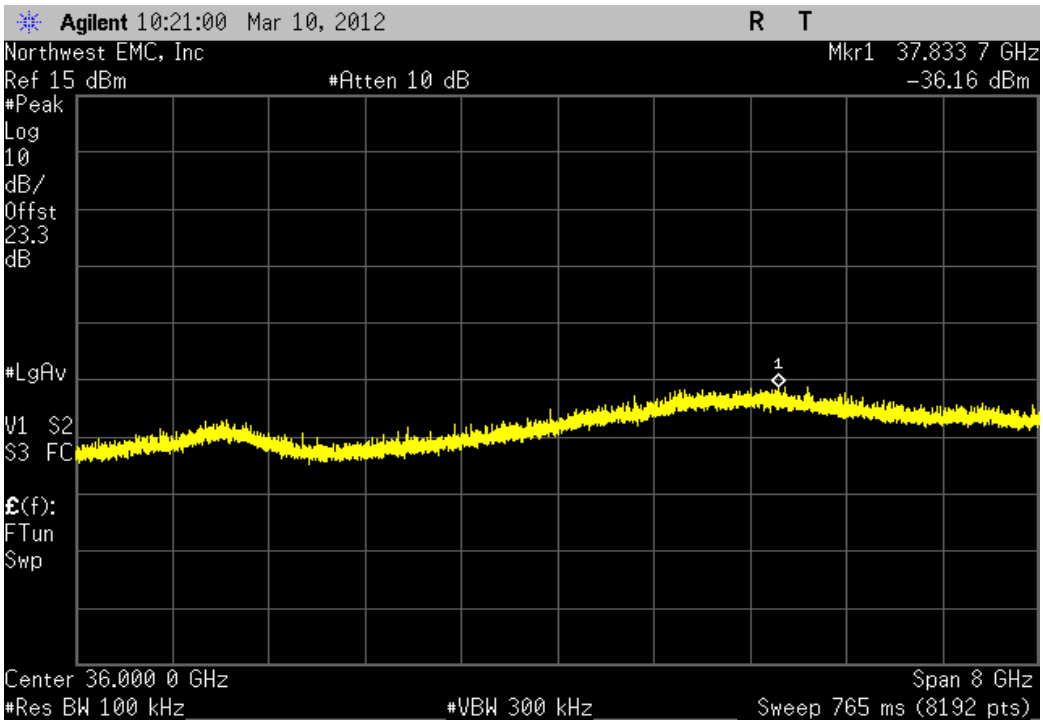


Spurious Conducted Emissions

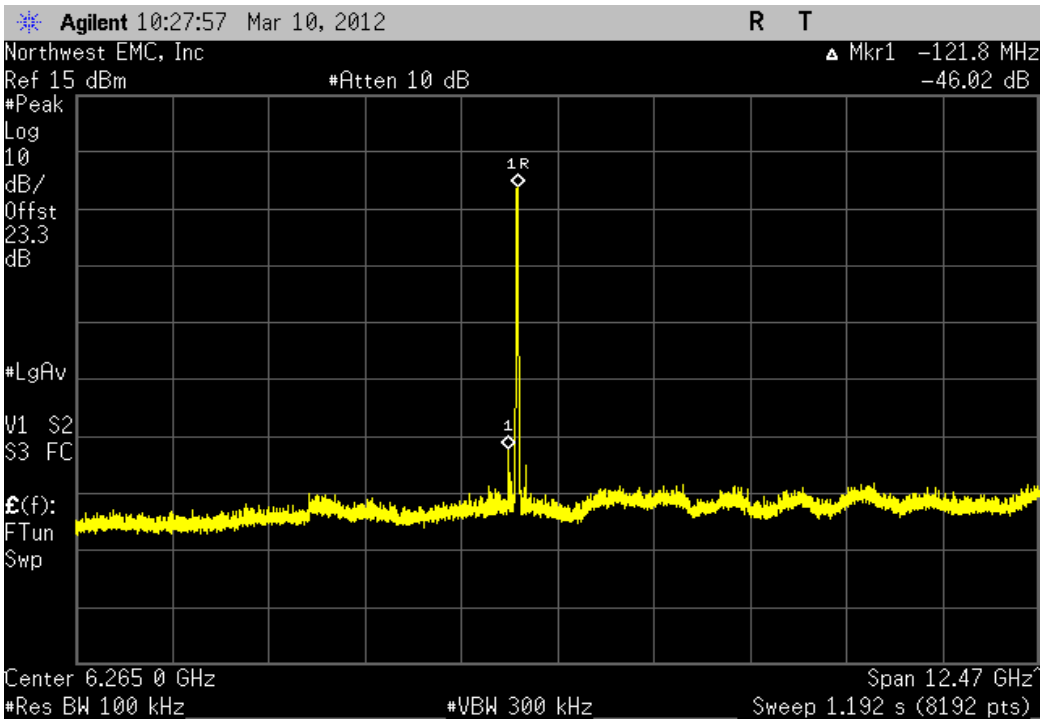
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, High Channel 165, 5825 MHz				
Frequency Range		**Value**	**Limit**	**Result**
25 GHz - 32 GHz		-41.5 dBc	≤ -20 dBc	Pass



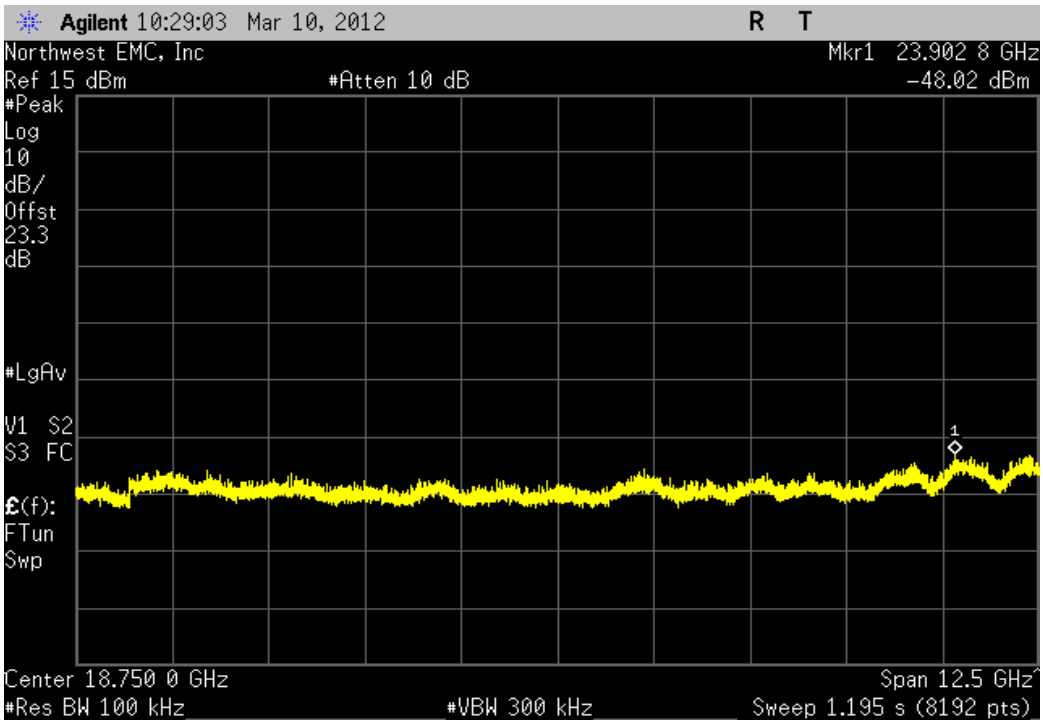
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, High Channel 165, 5825 MHz				
Frequency Range		**Value**	**Limit**	**Result**
32 GHz - 40 GHz		-32.33 dBc	≤ -20 dBc	Pass



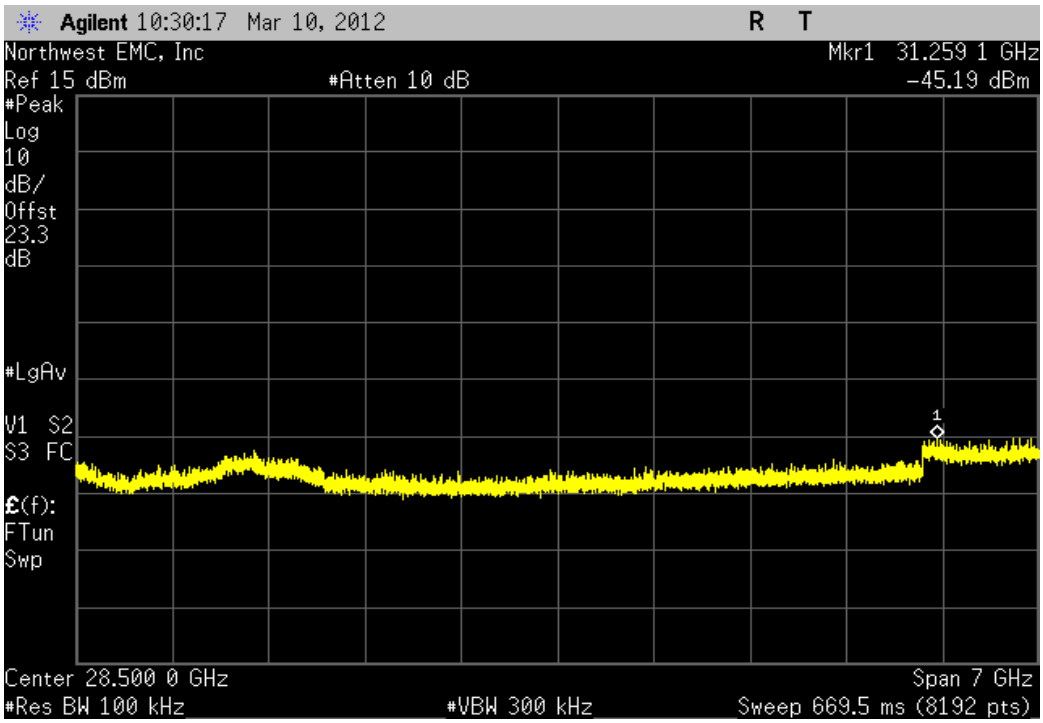
5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Low Channel 149, 5745 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-46.02 dBc	≤ -20 dBc	Pass



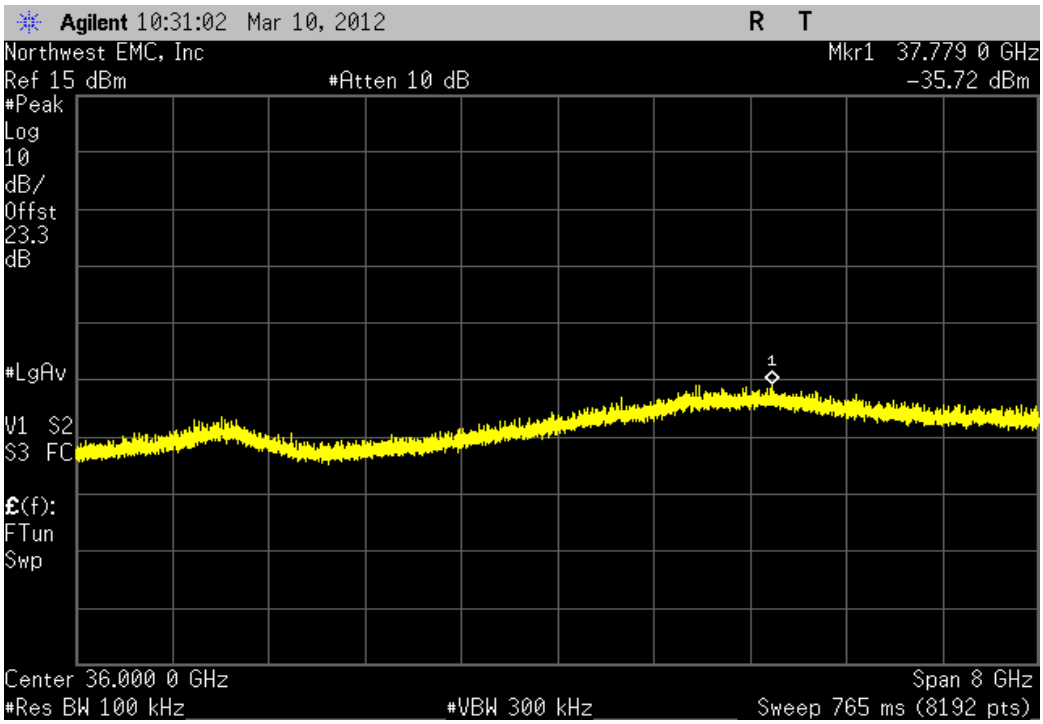
5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Low Channel 149, 5745 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-46.82 dBc	≤ -20 dBc	Pass



5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Low Channel 149, 5745 MHz				
Frequency Range		**Value**	**Limit**	**Result**
25 GHz - 32 GHz		-43.99 dBc	≤ -20 dBc	Pass

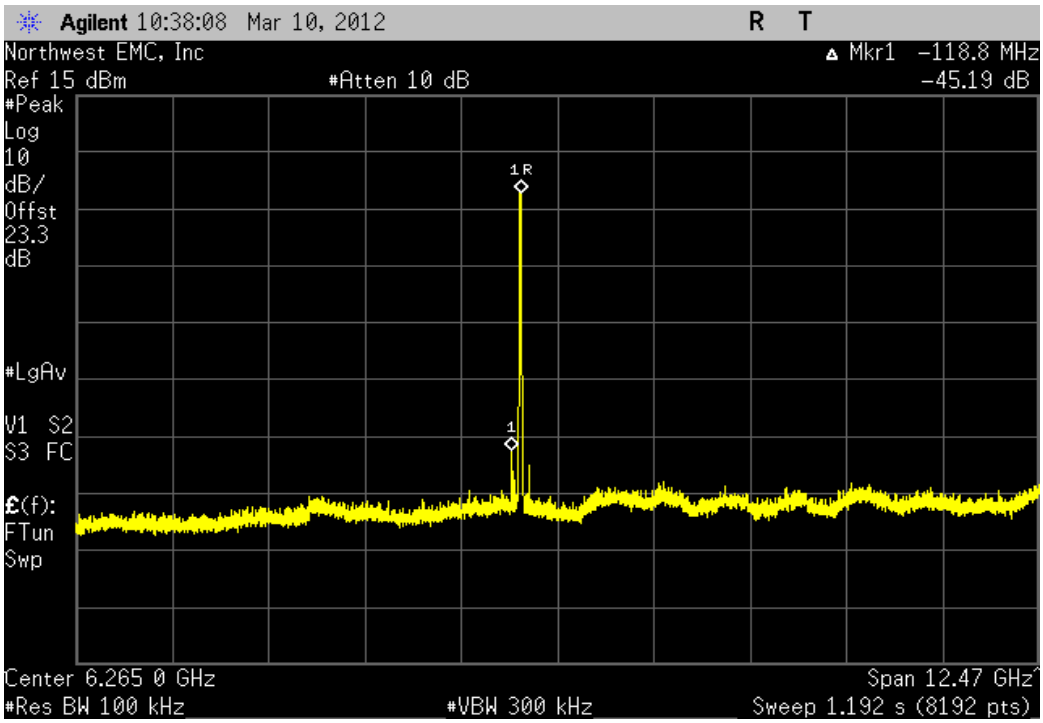


5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Low Channel 149, 5745 MHz				
Frequency Range		**Value**	**Limit**	**Result**
32 GHz - 40 GHz		-34.52 dBc	≤ -20 dBc	Pass

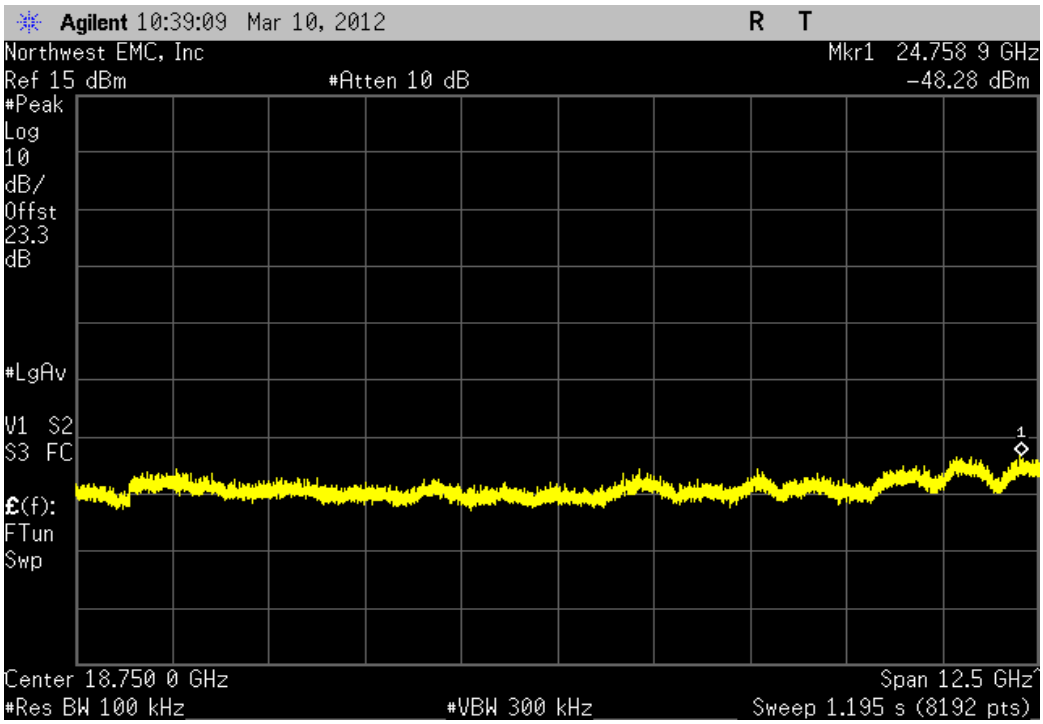


Spurious Conducted Emissions

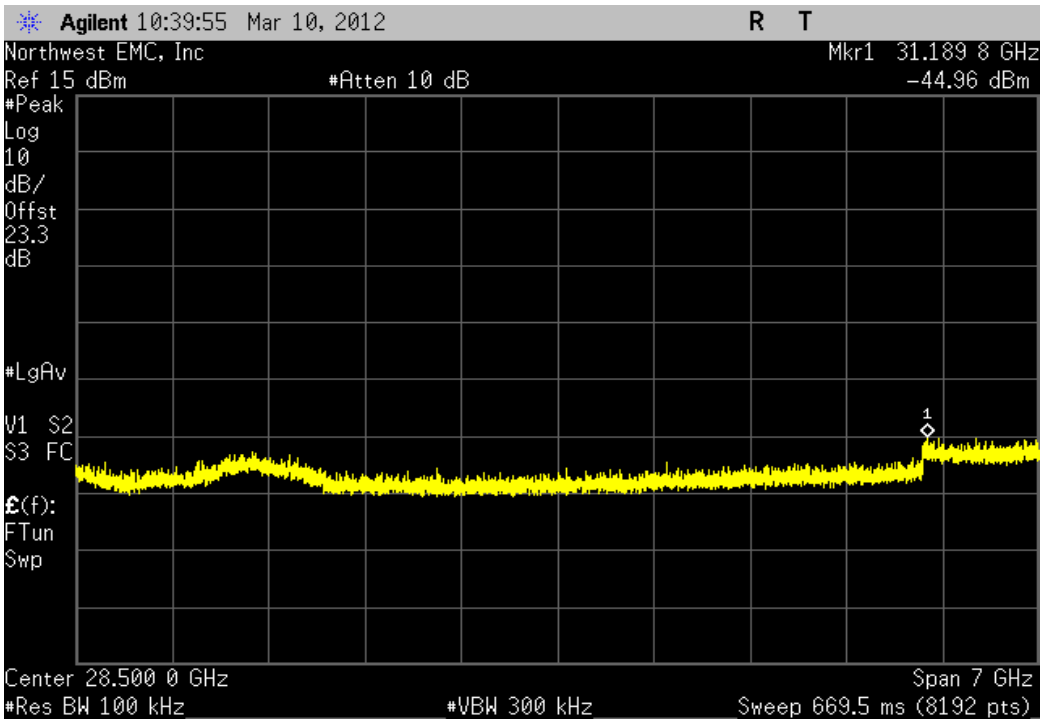
5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Mid Channel 157, 5785 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-45.19 dBc	≤ -20 dBc	Pass



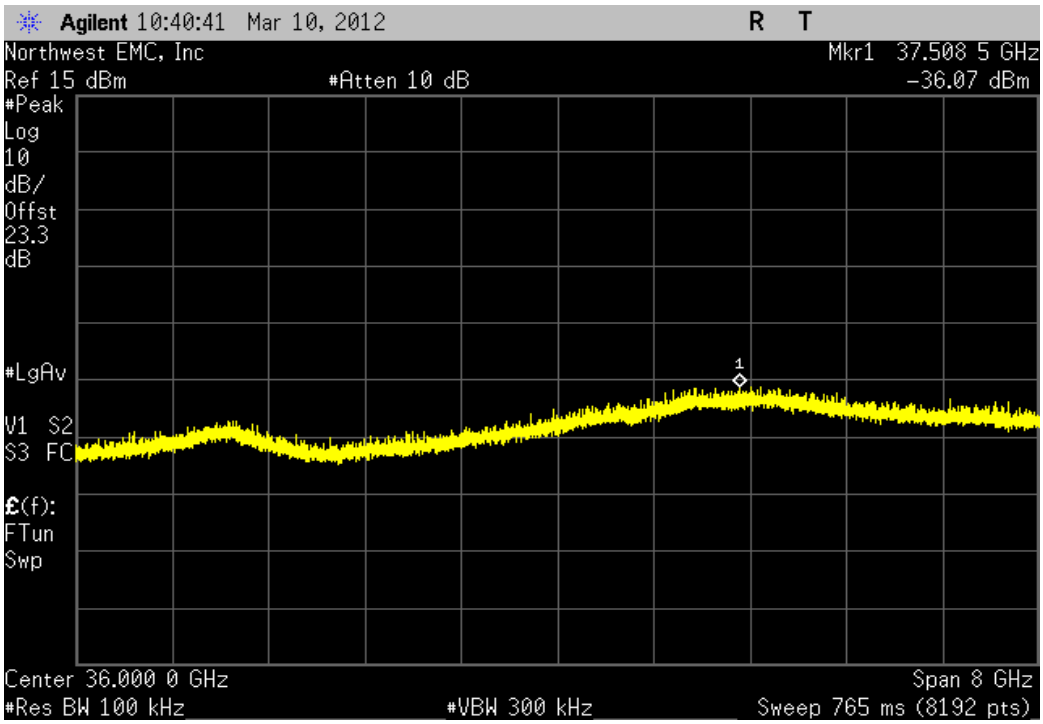
5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Mid Channel 157, 5785 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-45.97 dBc	≤ -20 dBc	Pass



5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Mid Channel 157, 5785 MHz				
Frequency Range		**Value**	**Limit**	**Result**
25 GHz - 32 GHz		-42.64 dBc	≤ -20 dBc	Pass

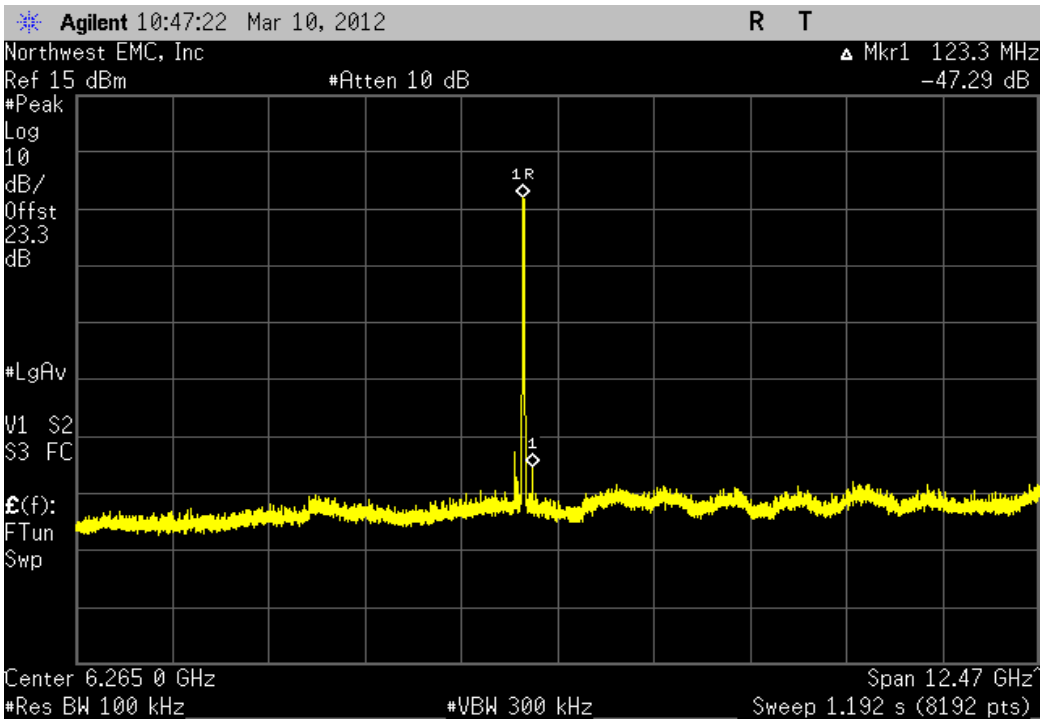


5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Mid Channel 157, 5785 MHz				
Frequency Range		**Value**	**Limit**	**Result**
32 GHz - 40 GHz		-33.76 dBc	≤ -20 dBc	Pass

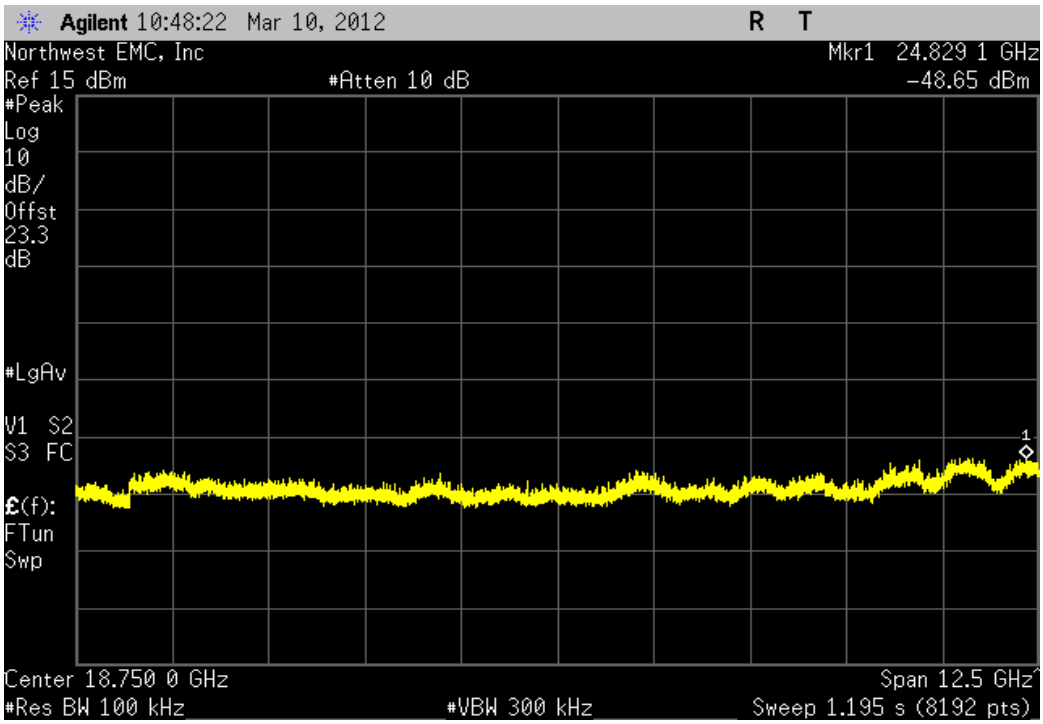


Spurious Conducted Emissions

5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, High Channel 165, 5825 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-47.29 dBc	≤ -20 dBc	Pass

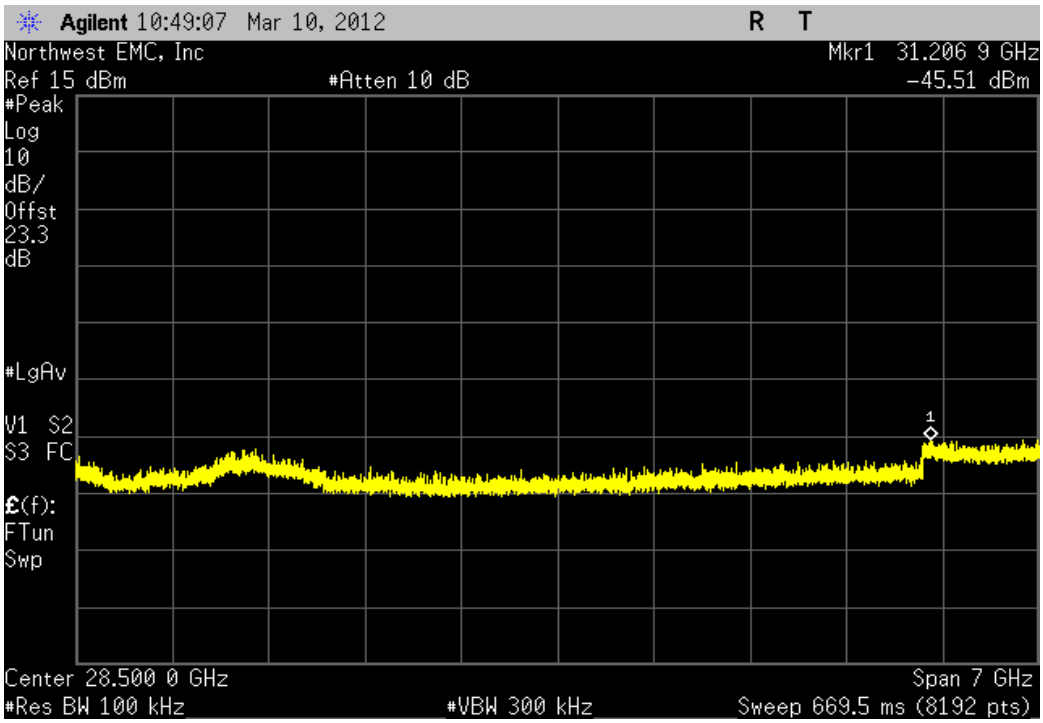


5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, High Channel 165, 5825 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-45.56 dBc	≤ -20 dBc	Pass

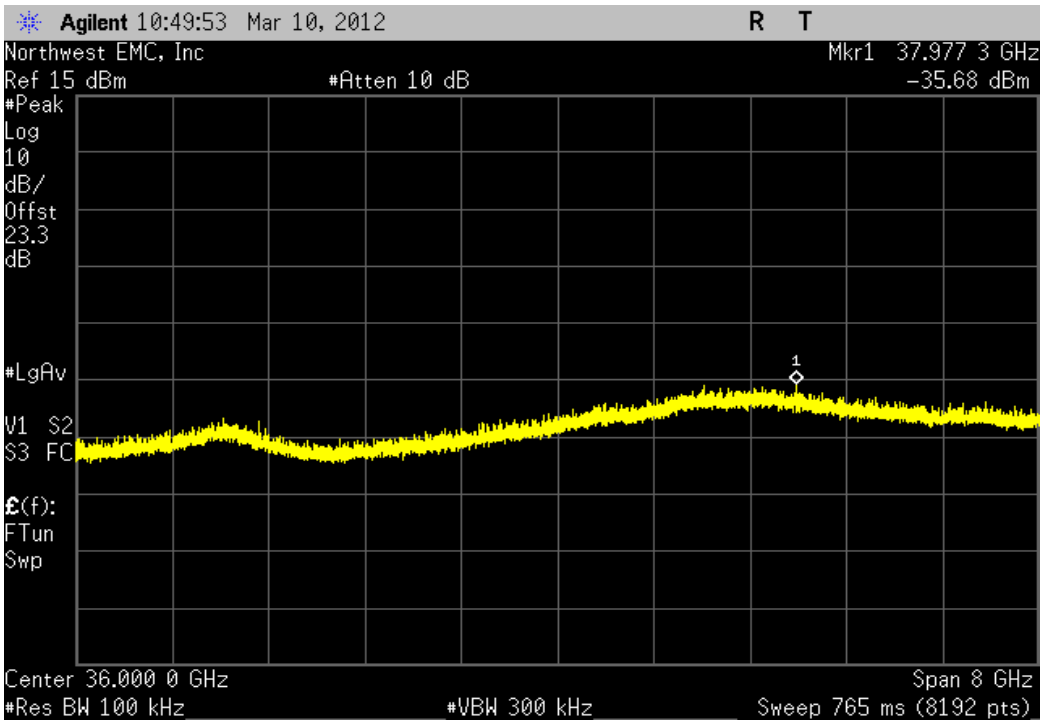


Spurious Conducted Emissions

5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, High Channel 165, 5825 MHz				
Frequency Range		**Value**	**Limit**	**Result**
25 GHz - 32 GHz		-42.42 dBc	≤ -20 dBc	Pass

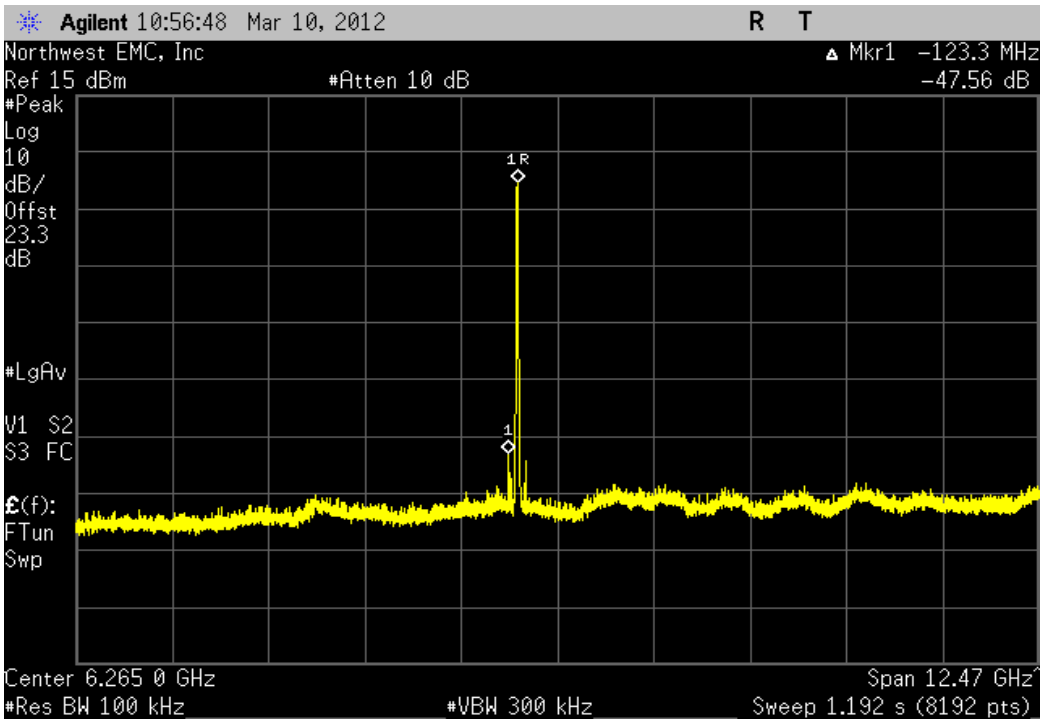


5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, High Channel 165, 5825 MHz				
Frequency Range		**Value**	**Limit**	**Result**
32 GHz - 40 GHz		-32.59 dBc	≤ -20 dBc	Pass

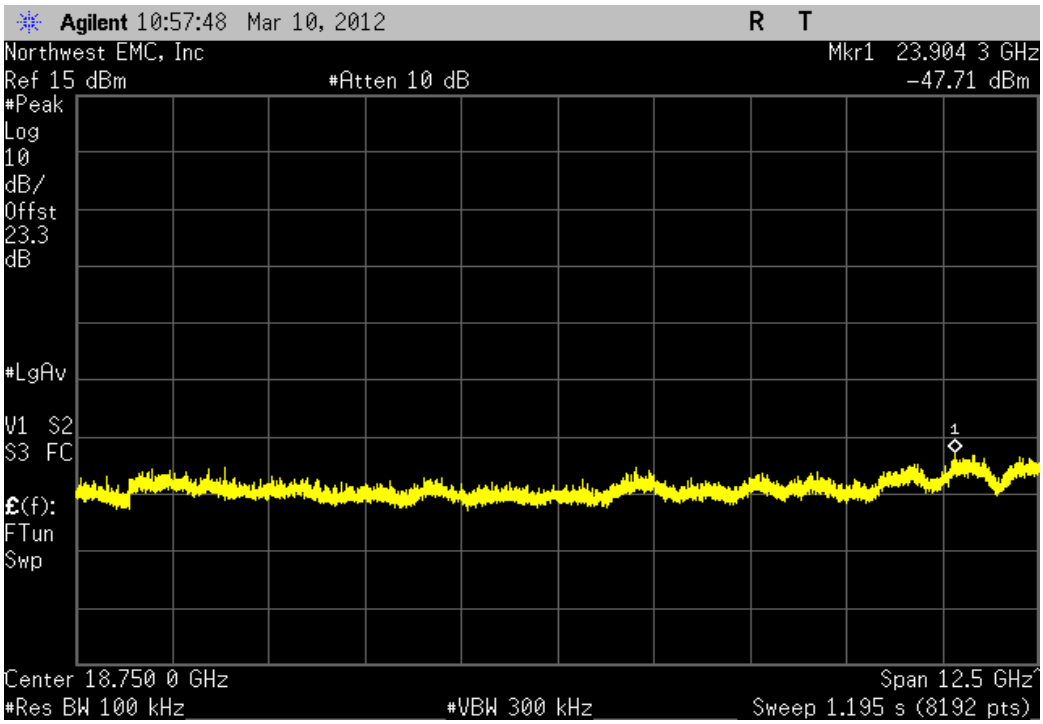


Spurious Conducted Emissions

5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Low Channel 149, 5745 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-47.56 dBc	≤ -20 dBc	Pass

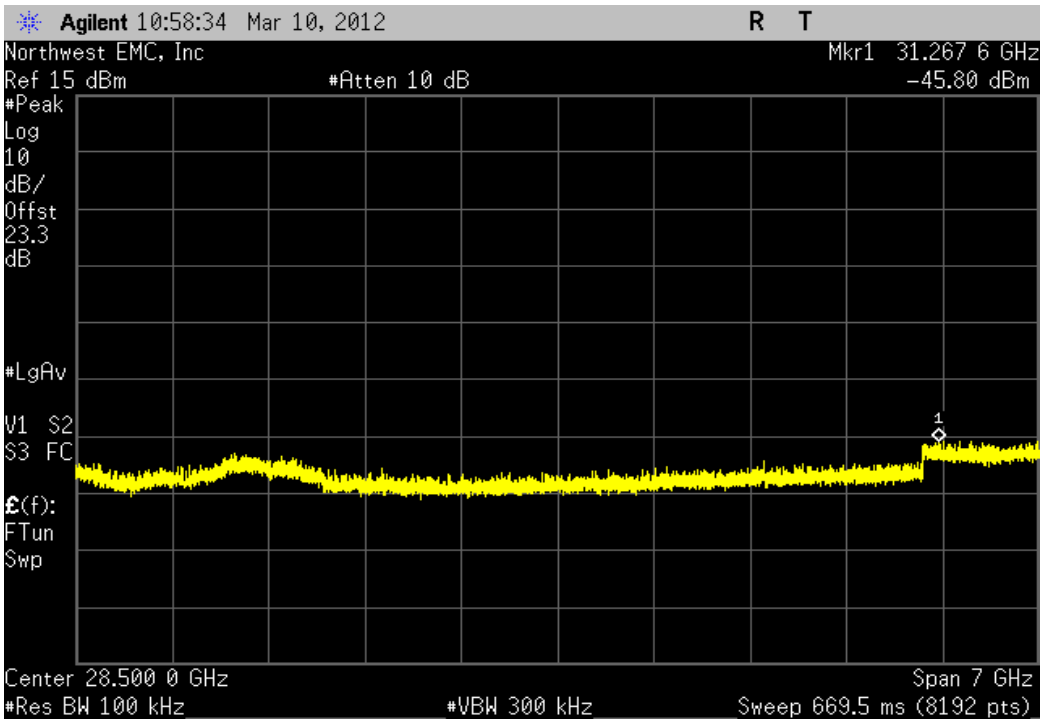


5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Low Channel 149, 5745 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-47.23 dBc	≤ -20 dBc	Pass

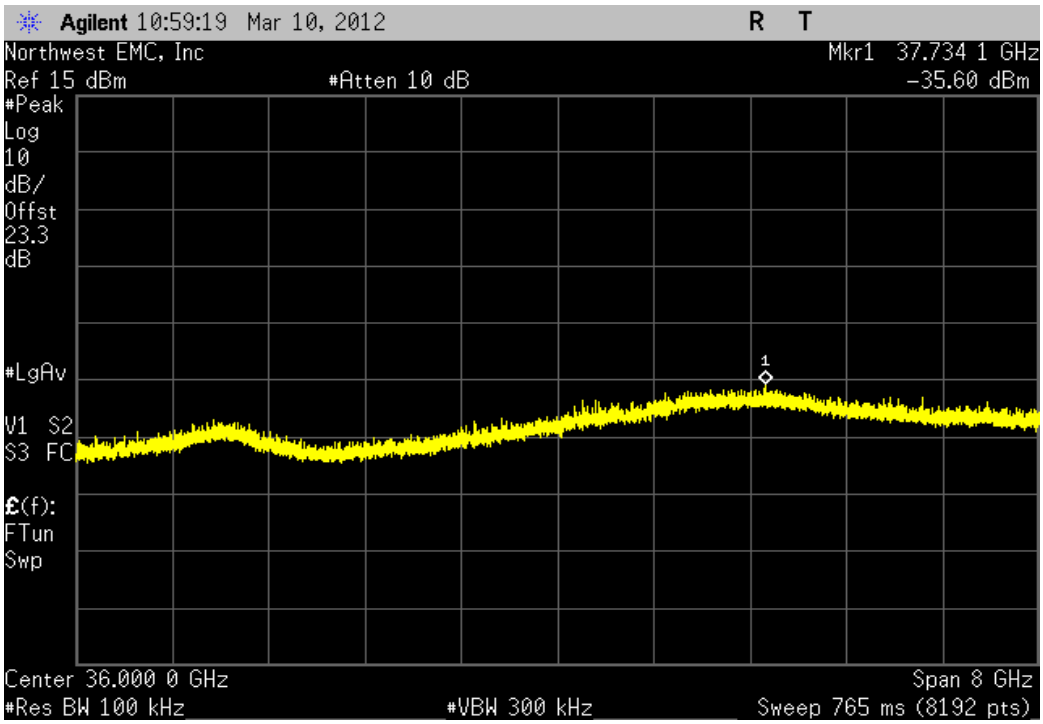


Spurious Conducted Emissions

5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Low Channel 149, 5745 MHz				
Frequency Range		**Value**	**Limit**	**Result**
25 GHz - 32 GHz		-45.32 dBc	≤ -20 dBc	Pass

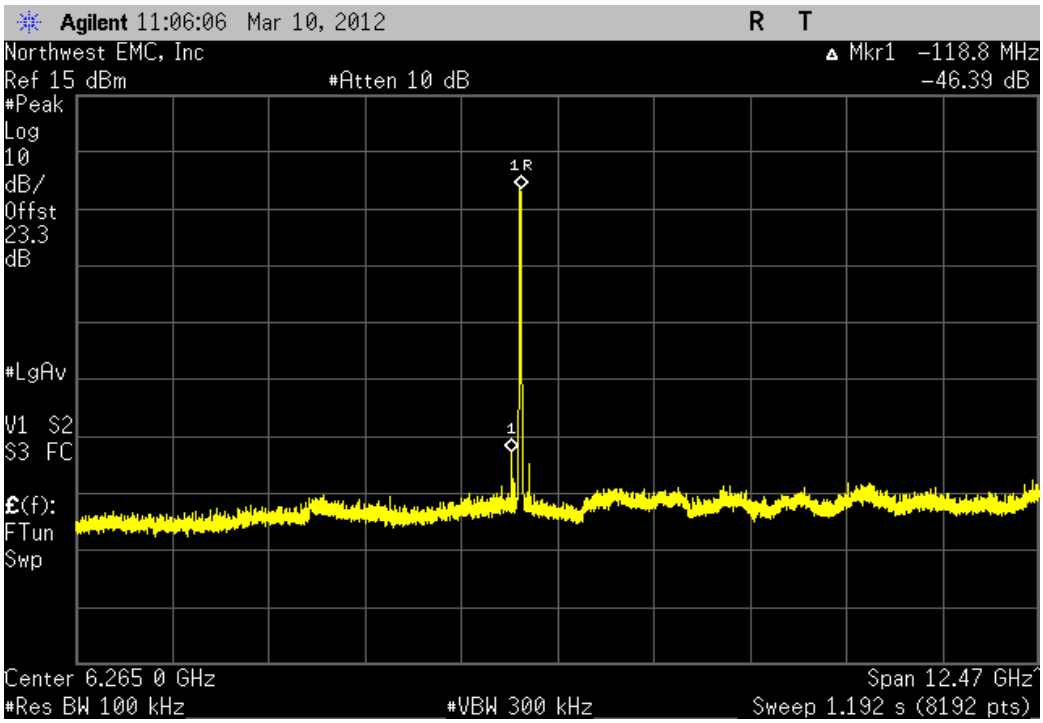


5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Low Channel 149, 5745 MHz				
Frequency Range		**Value**	**Limit**	**Result**
32 GHz - 40 GHz		-35.12 dBc	≤ -20 dBc	Pass

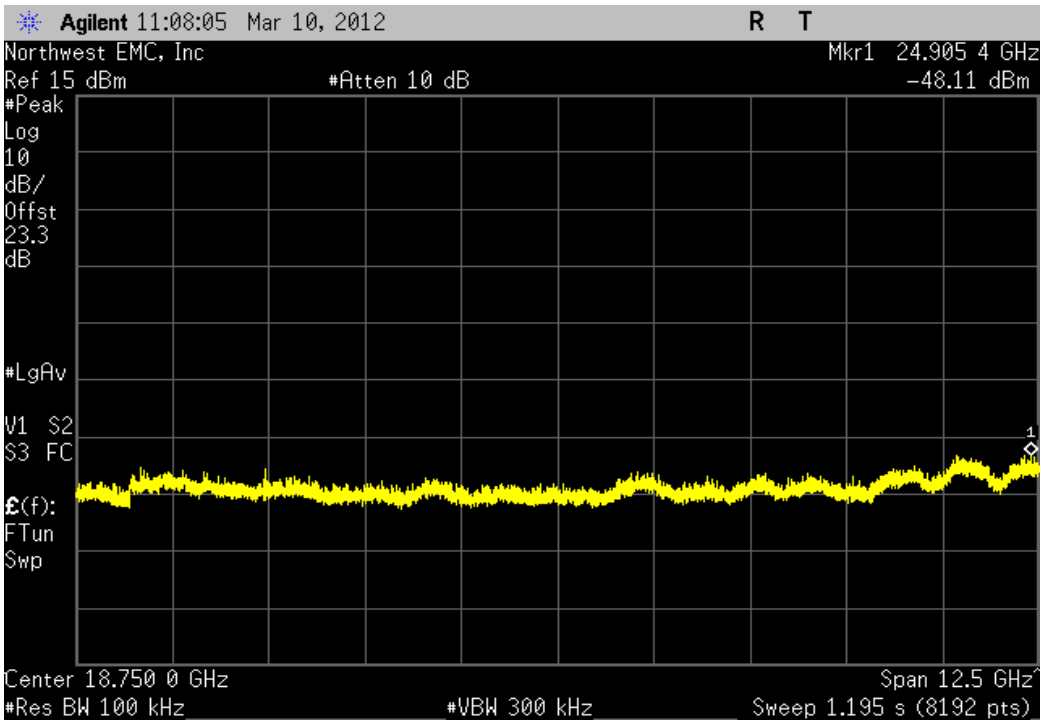


Spurious Conducted Emissions

5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Mid Channel 157, 5785 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-46.39 dBc	≤ -20 dBc	Pass

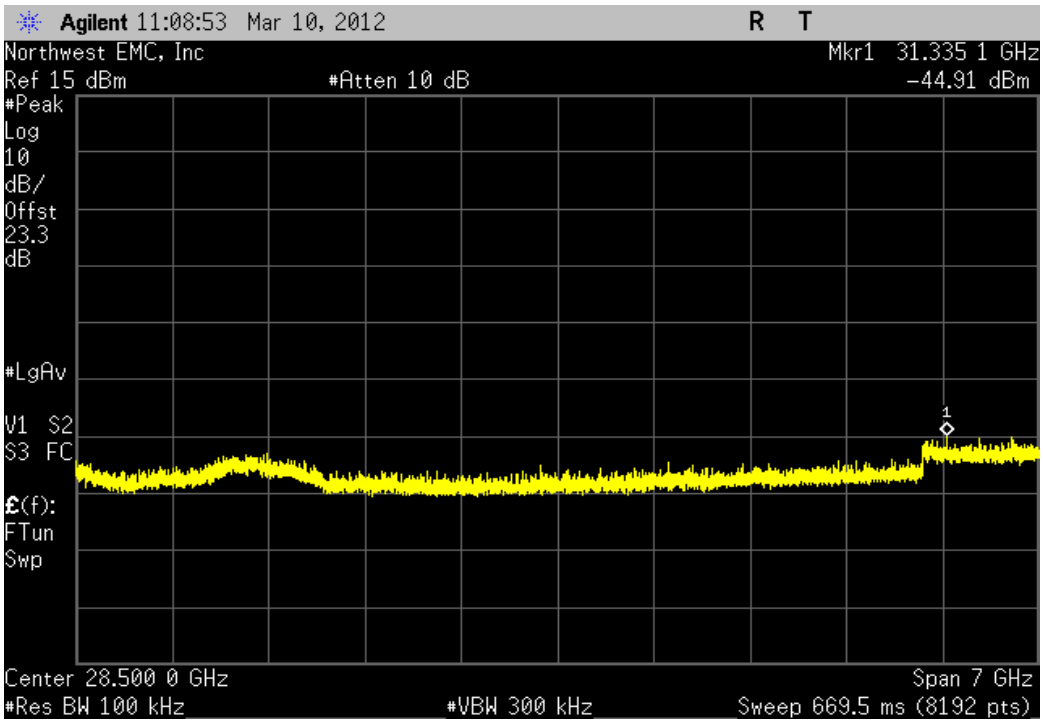


5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Mid Channel 157, 5785 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-46.73 dBc	≤ -20 dBc	Pass

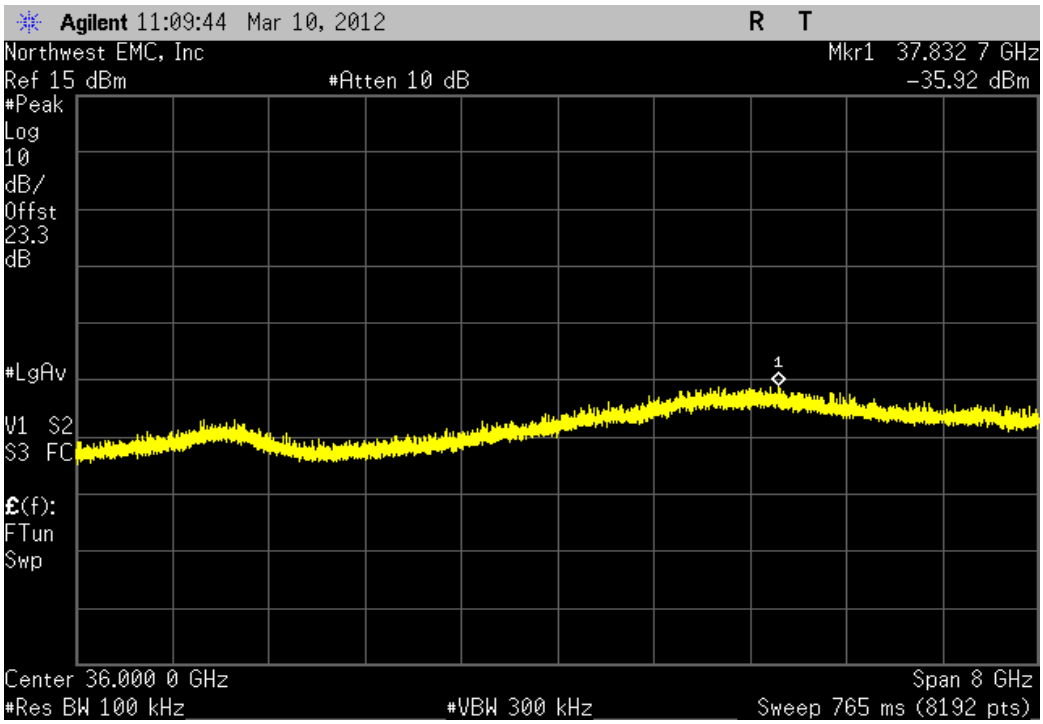


Spurious Conducted Emissions

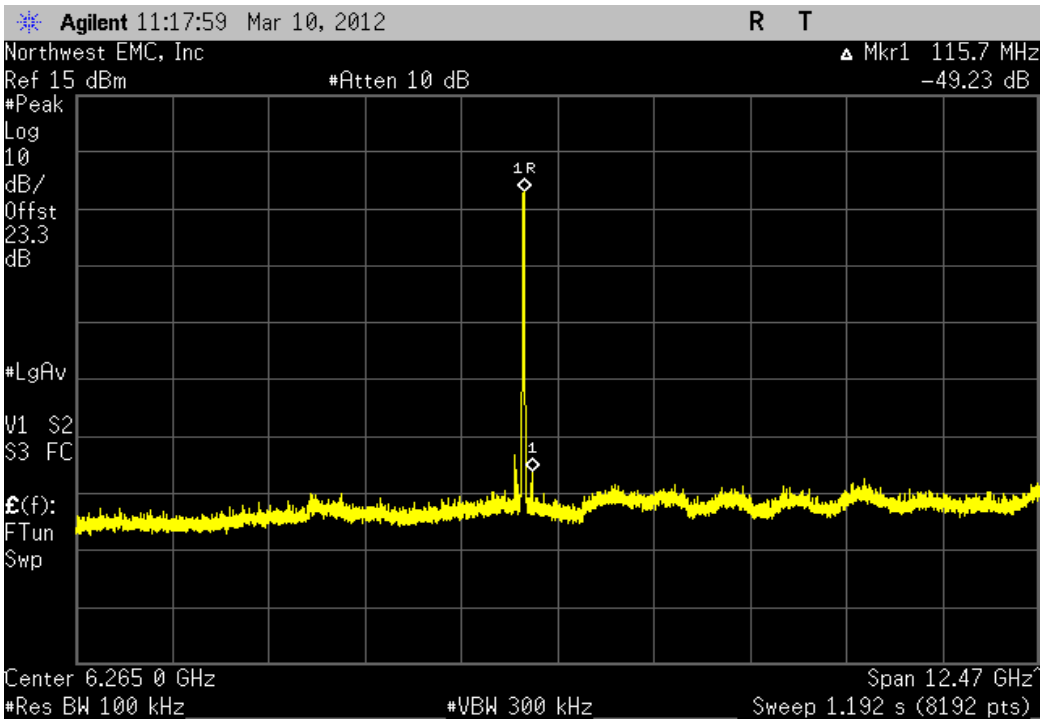
5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Mid Channel 157, 5785 MHz				
Frequency Range		**Value**	**Limit**	**Result**
25 GHz - 32 GHz		-43.53 dBc	≤ -20 dBc	Pass



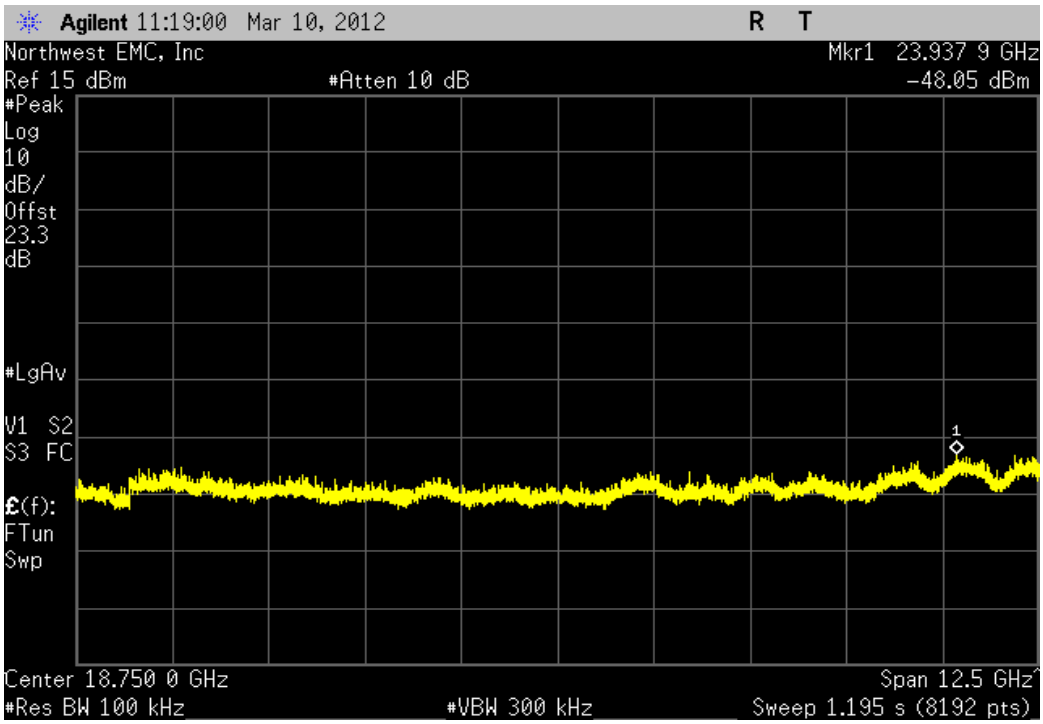
5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Mid Channel 157, 5785 MHz				
Frequency Range		**Value**	**Limit**	**Result**
32 GHz - 40 GHz		-34.54 dBc	≤ -20 dBc	Pass



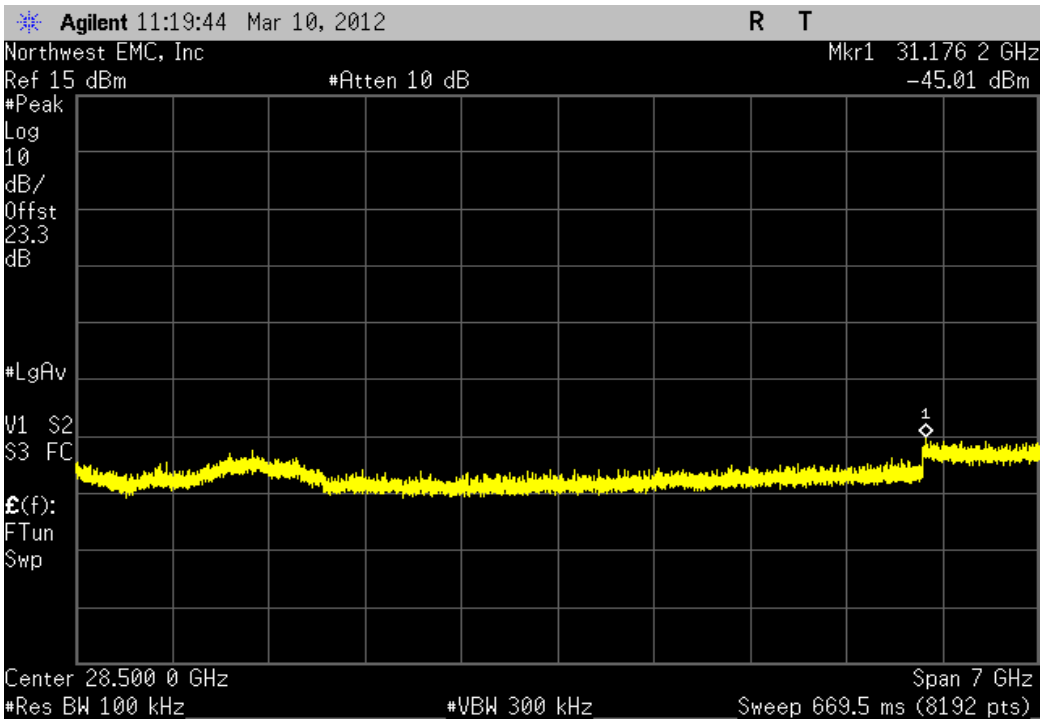
5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, High Channel 165, 5825 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-49.23 dBc	≤ -20 dBc	Pass



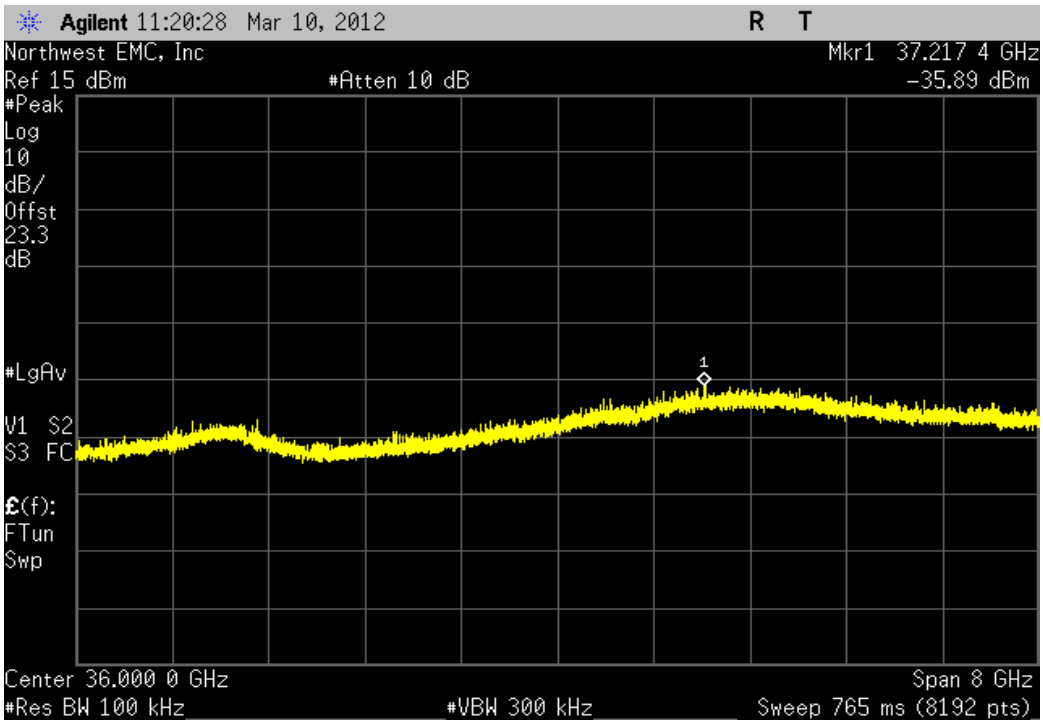
5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, High Channel 165, 5825 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-46.12 dBc	≤ -20 dBc	Pass



5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, High Channel 165, 5825 MHz				
Frequency Range		**Value**	**Limit**	**Result**
25 GHz - 32 GHz		-43.08 dBc	≤ -20 dBc	Pass



5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, High Channel 165, 5825 MHz				
Frequency Range		**Value**	**Limit**	**Result**
32 GHz - 40 GHz		-33.96 dBc	≤ -20 dBc	Pass



Power Spectral Density

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Attenuator SMA - 20dB, 40 GHz	Fairview Microwave	SA4014-20	AQI	10/12/2011	12
Signal Generator	Agilent	N5183A	TIA	1/27/2012	12
Spectrum Analyzer	Agilent	E4446A	AAT	3/2/2012	12

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The peak power spectral density measurements were measured with the EUT set to the required transmit frequencies in each band. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the lowest, middle, and maximum data rate for each modulation type available. Per the procedure outlined in FCC KDB 558074, March 23, 2005, the spectrum analyzer was used as follows:

The emission peak(s) were located and zoom in on within the passband. The resolution bandwidth was set to 3 kHz, the video bandwidth was set to greater than or equal to the resolution bandwidth. The sweep speed was set equal to the span divided by 3 kHz (sweep = (SPAN/3 kHz)). For example, given a span of 1.5 MHz, the sweep should be $1.5 \times 10^6 \div 3 \times 103 = 500$ seconds. External attenuation was used and added to the reading. The following FCC procedure was used for modifying the power spectral density measurements:

"If the spectrum line spacing cannot be resolved on the available spectrum analyzer, the noise density function on most modern conventional spectrum analyzers will directly measure the noise power density normalized to a 1 Hz noise power bandwidth. Add 34.8 dB for correction to 3 kHz."

Power Spectral Density

EUT:	Sigma Pumps Integrated 802.11abg Module			**Work Order:**	DGII0053
Serial Number:	7.06			**Date:**	03/20/12
Customer:	Digi International			**Temperature:**	22.78°C
Attendees:	None			**Humidity:**	55%
Project:	None			**Barometric Pres.:**	1007.8
Tested by:	Johnathan Lee	**Power:**	110VAC/60Hz	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2012	ANSI C63.10:2009

COMMENTS

Added second harmonic filter on 5GHz path (footprint exists on board for this filter). Duty Cycle was measured at 100% operation. Channel 149, 157, 165: Power level 50. Channels 1, 6, 11 at 1 Mbps, 11 Mbps and Channel 6 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 60. Channel 1 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 45. Channel 11 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 50.

DEVIATIONS FROM TEST STANDARD

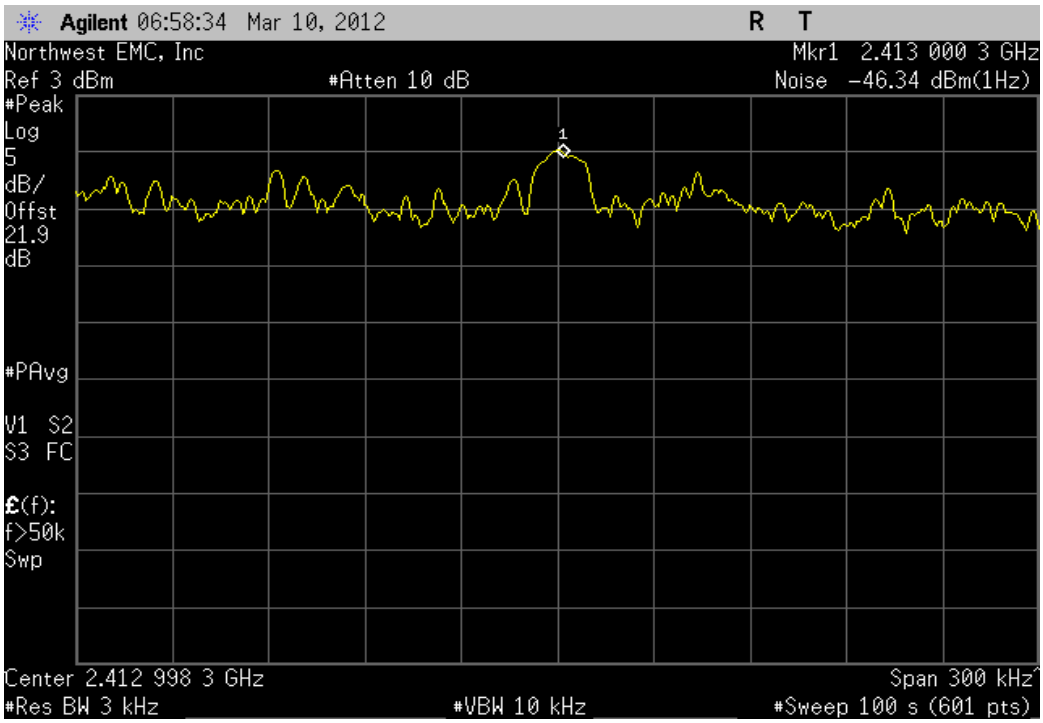
None

Configuration #	2	Signature	Trevor Bulls

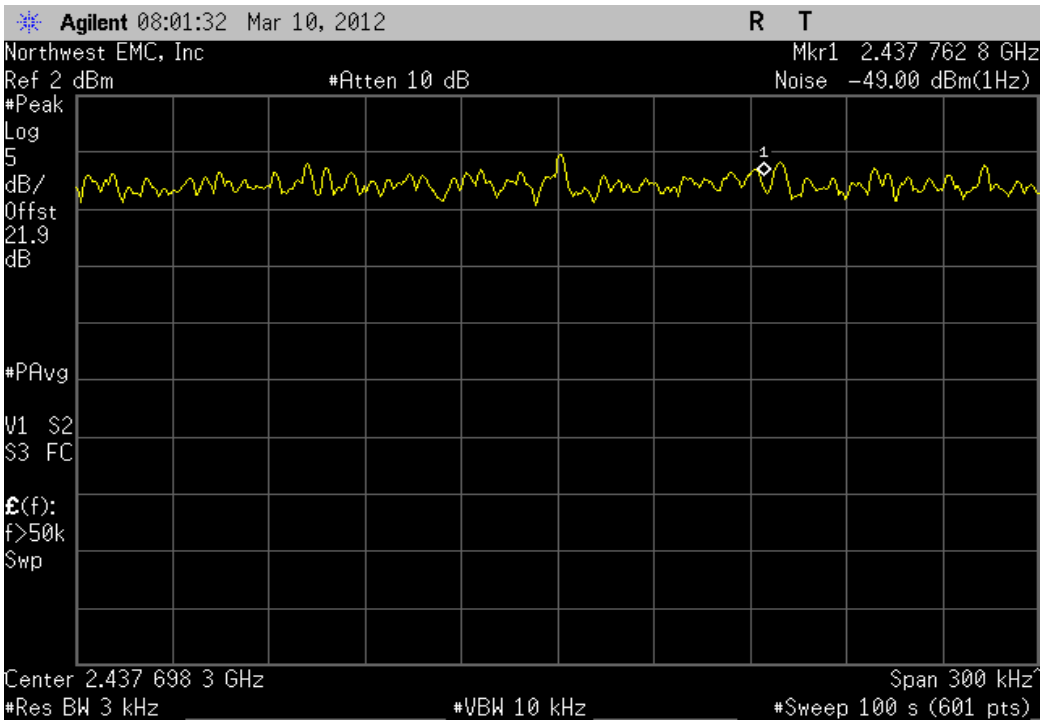
	Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
2400 MHz - 2483.5 MHz Band					
802.11(b) 1 Mbps					
Low Channel 1, 2412 MHz	-46.343	34.8	-11.543	8	Pass
Mid Channel 6, 2437 MHz	-49.002	34.8	-14.202	8	Pass
High Channel 11, 2462 MHz	-42.908	34.8	-8.108	8	Pass
802.11(b) 11 Mbps					
Low Channel 1, 2412 MHz	-50.481	34.8	-15.681	8	Pass
Mid Channel 6, 2437 MHz	-50.258	34.8	-15.458	8	Pass
High Channel 11, 2462 MHz	-50.364	34.8	-15.564	8	Pass
802.11(g) 6 Mbps					
Low Channel 1, 2412 MHz	-56.802	34.8	-22.002	8	Pass
Mid Channel 6, 2437 MHz	-52.877	34.8	-18.077	8	Pass
High Channel 11, 2462 MHz	-55.715	34.8	-20.915	8	Pass
802.11(g) 36 Mbps					
Low Channel 1, 2412 MHz	-56.734	34.8	-21.934	8	Pass
Mid Channel 6, 2437 MHz	-52.778	34.8	-17.978	8	Pass
High Channel 11, 2462 MHz	-55.469	34.8	-20.669	8	Pass
802.11(g) 54 Mbps					
Low Channel 1, 2412 MHz	-56.083	34.8	-21.283	8	Pass
Mid Channel 6, 2437 MHz	-51.437	34.8	-16.637	8	Pass
High Channel 11, 2462 MHz	-54.982	34.8	-20.182	8	Pass
5725 MHz - 5850 MHz Band					
802.11(a) 6 Mbps					
Low Channel 149, 5745 MHz	-59.229	34.8	-24.429	8	Pass
Mid Channel 157, 5785 MHz	-59.54	34.8	-24.74	8	Pass
High Channel 165, 5825 MHz	-60.337	34.8	-25.537	8	Pass
802.11(a) 36 Mbps					
Low Channel 149, 5745 MHz	-59.275	34.8	-24.475	8	Pass
Mid Channel 157, 5785 MHz	-58.924	34.8	-24.124	8	Pass
High Channel 165, 5825 MHz	-60.056	34.8	-25.256	8	Pass
802.11(a) 54 Mbps					
Low Channel 149, 5745 MHz	-58.147	34.8	-23.347	8	Pass
Mid Channel 157, 5785 MHz	-59.139	34.8	-24.339	8	Pass
High Channel 165, 5825 MHz	-59.278	34.8	-24.478	8	Pass

Power Spectral Density

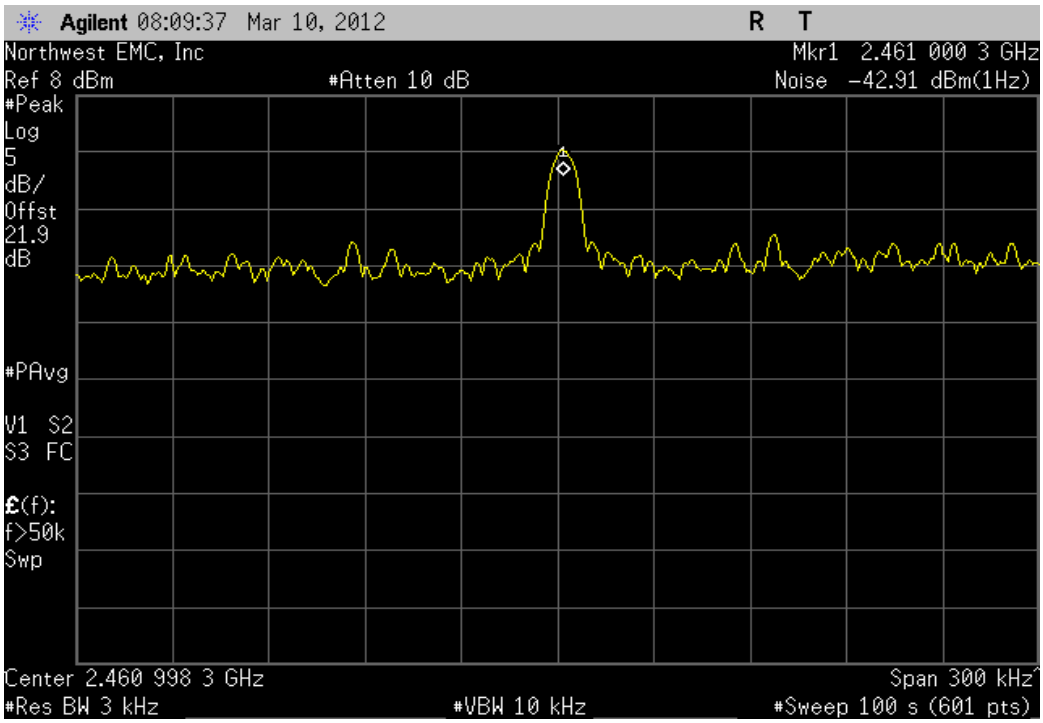
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-46.343	34.8	-11.543	8	Pass



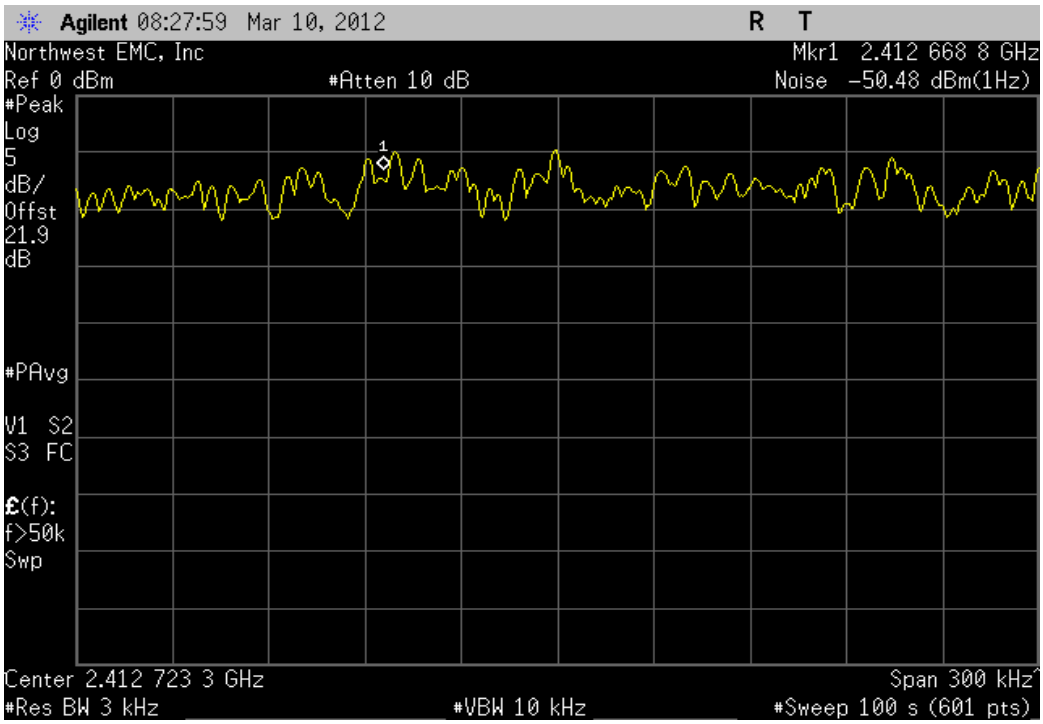
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-49.002	34.8	-14.202	8	Pass



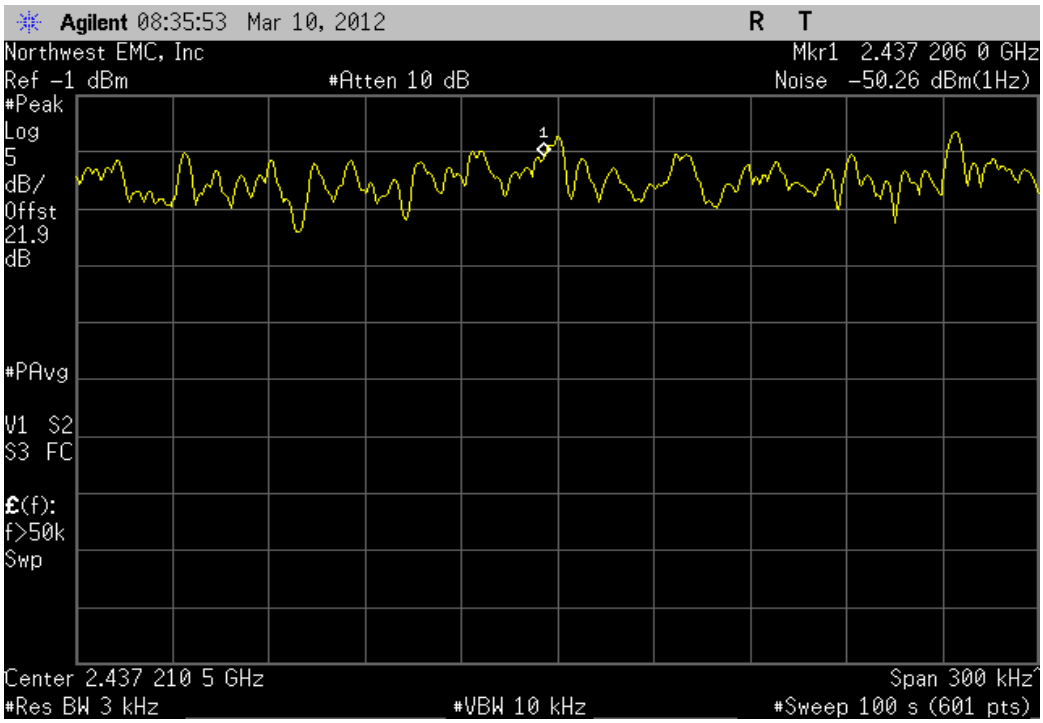
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-42.908	34.8	-8.108	8	Pass



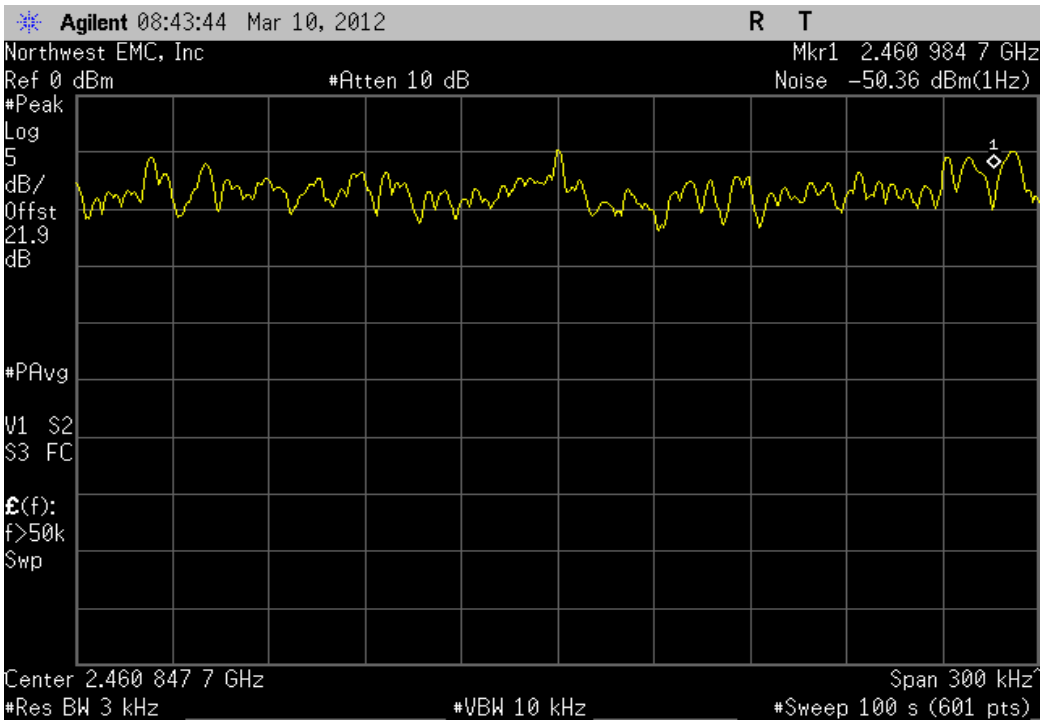
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-50.481	34.8	-15.681	8	Pass



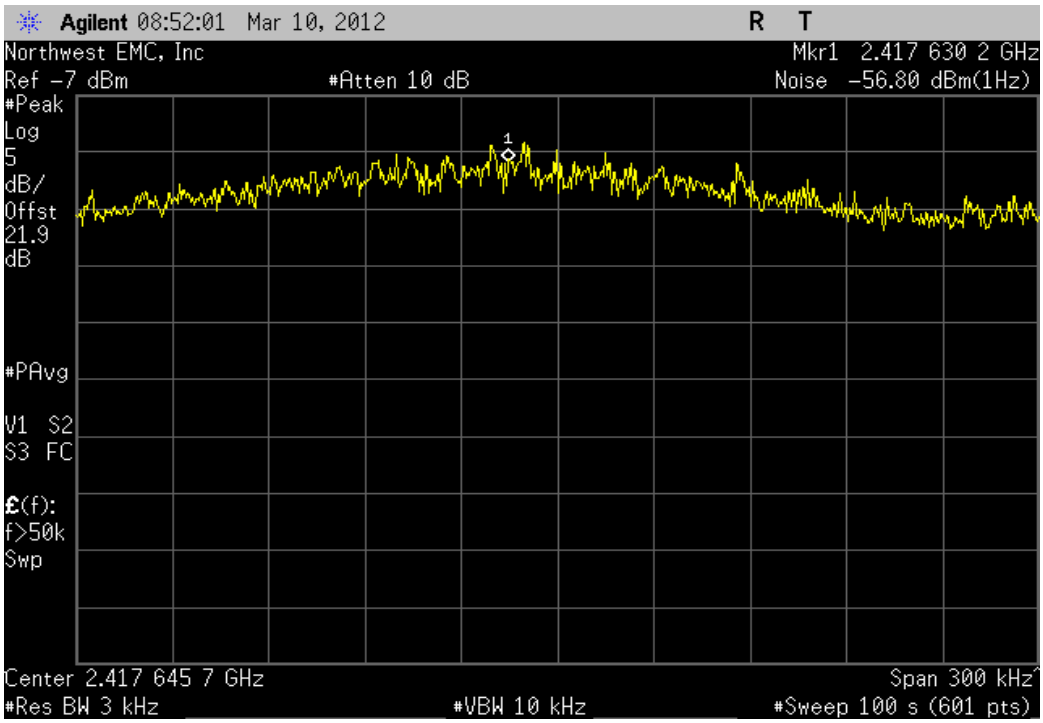
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-50.258	34.8	-15.458	8	Pass



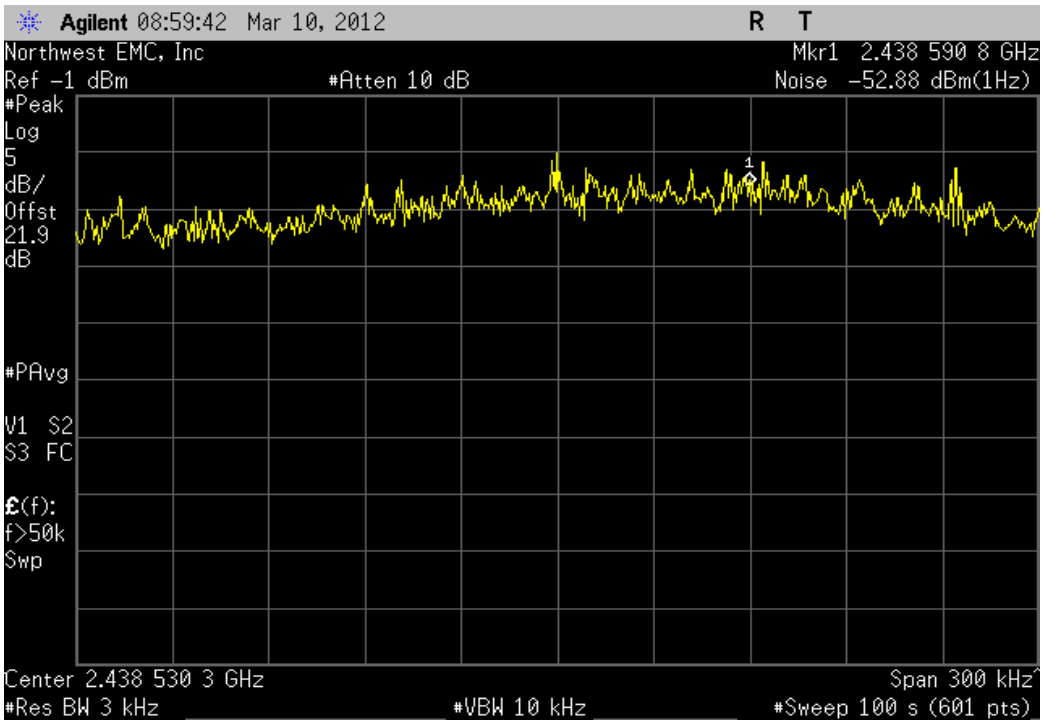
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-50.364	34.8	-15.564	8	Pass



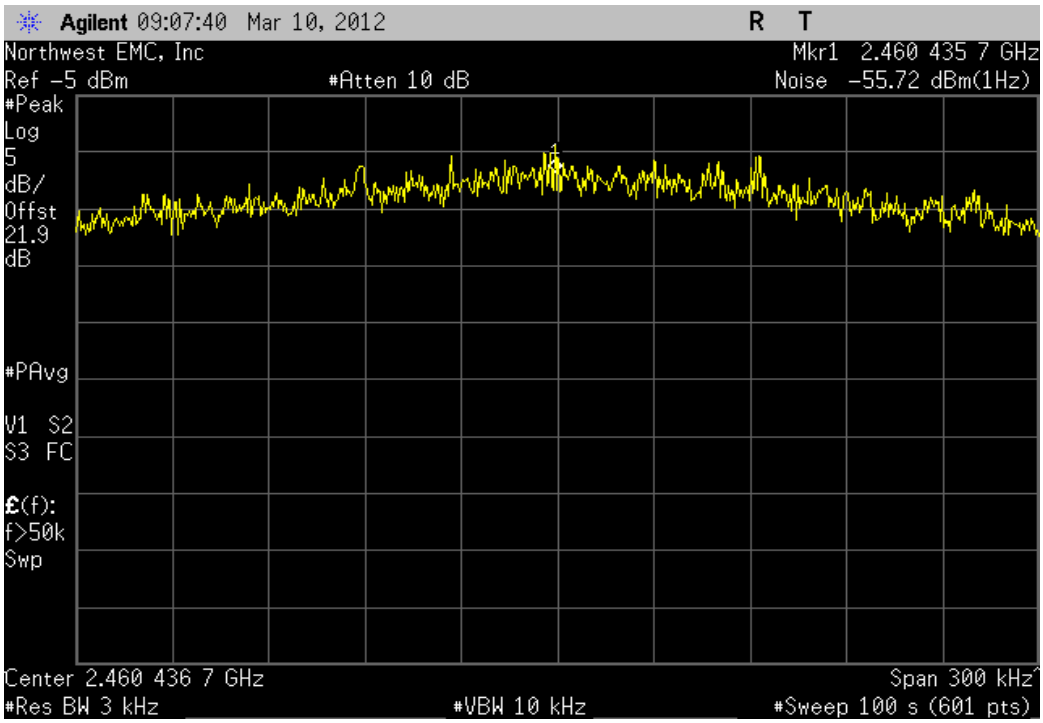
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-56.802	34.8	-22.002	8	Pass



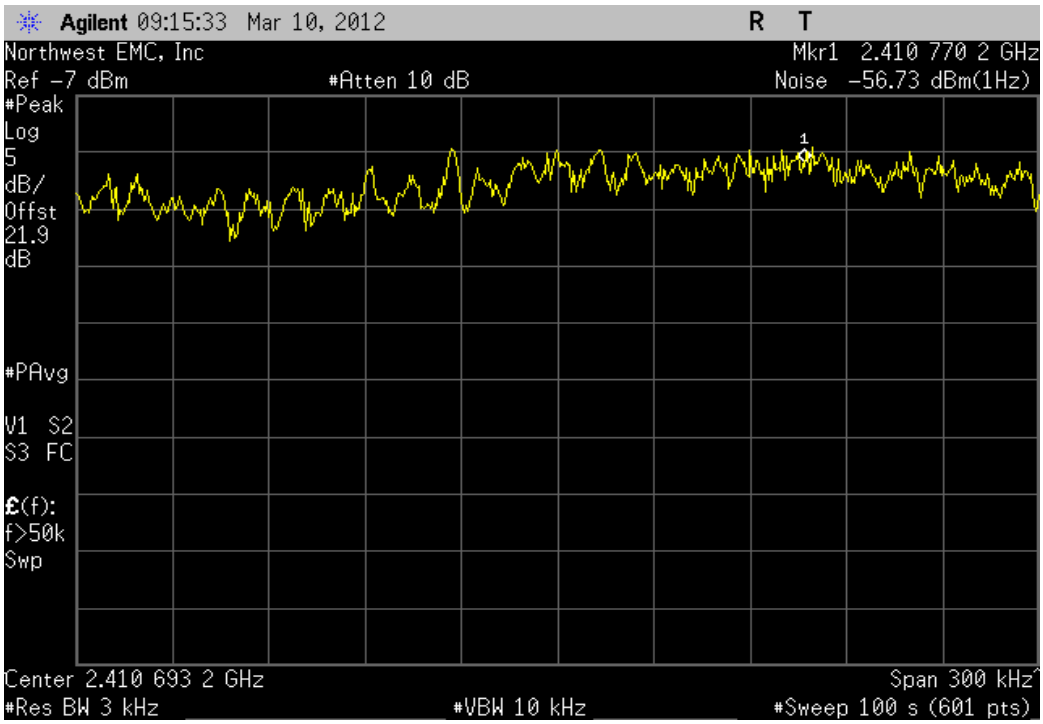
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-52.877	34.8	-18.077	8	Pass



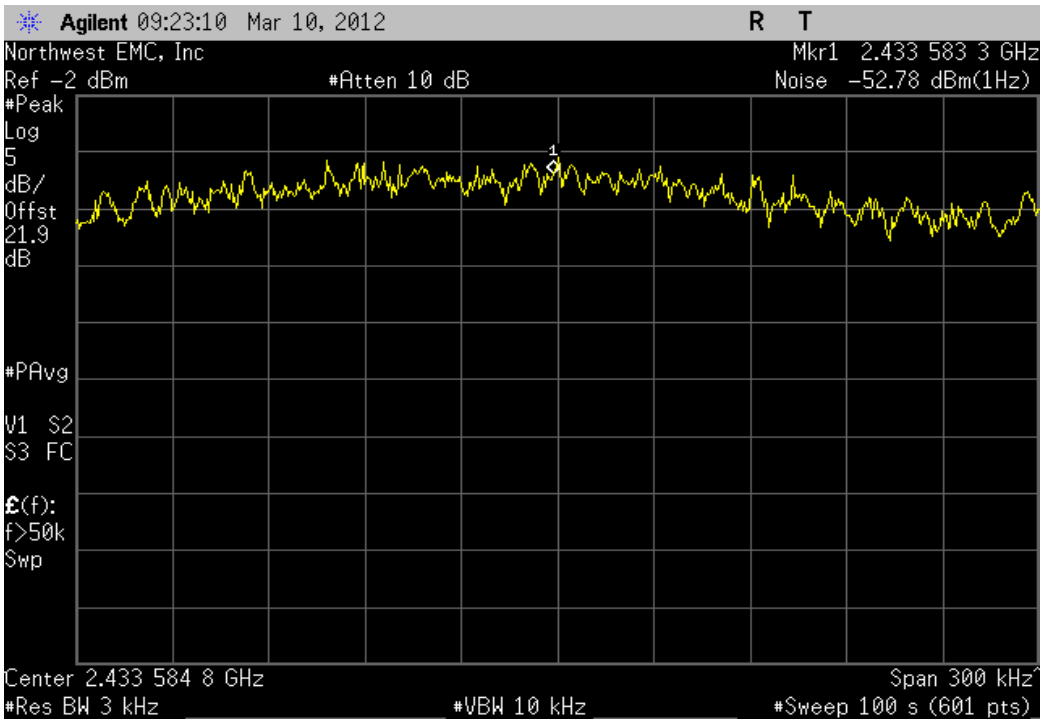
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-55.715	34.8	-20.915	8	Pass



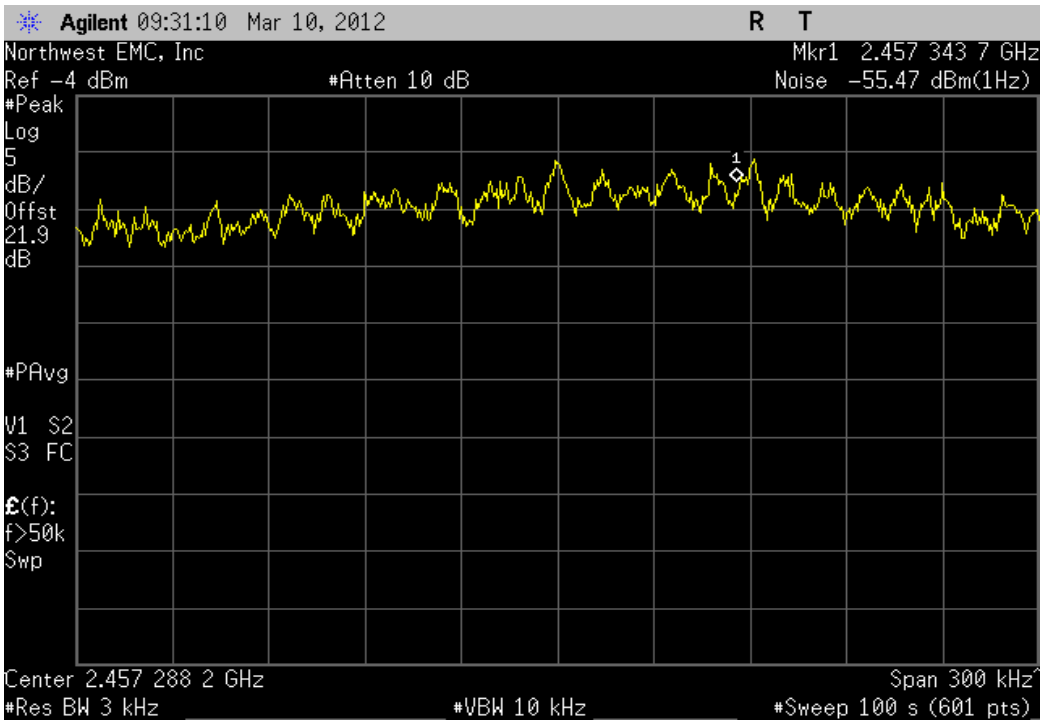
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-56.734	34.8	-21.934	8	Pass



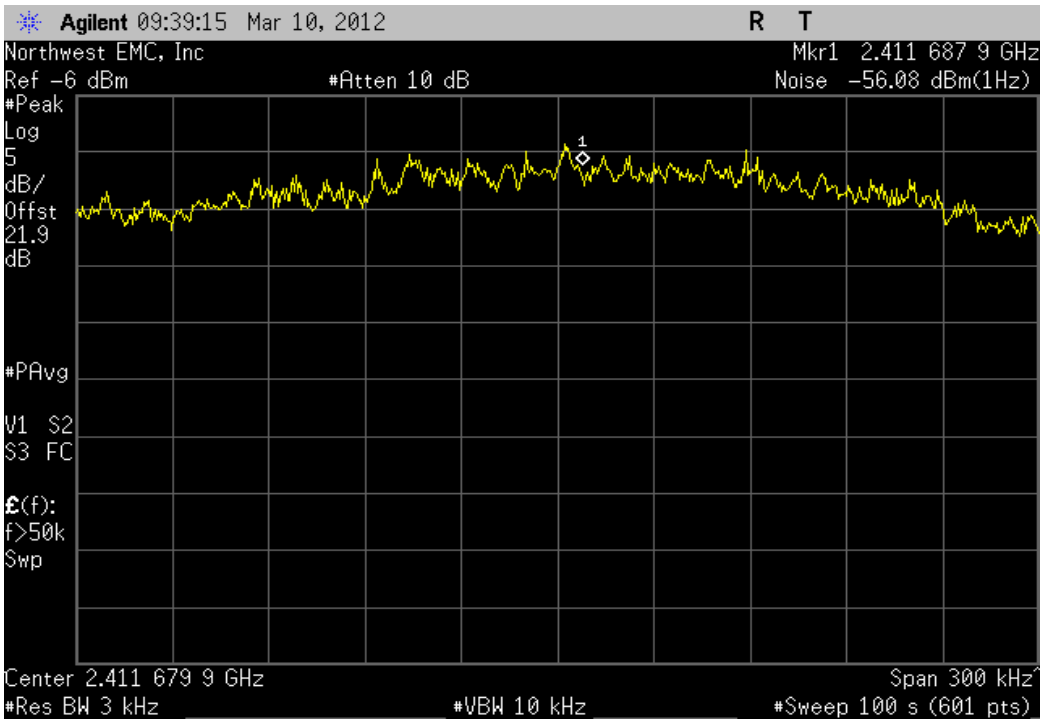
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-52.778	34.8	-17.978	8	Pass



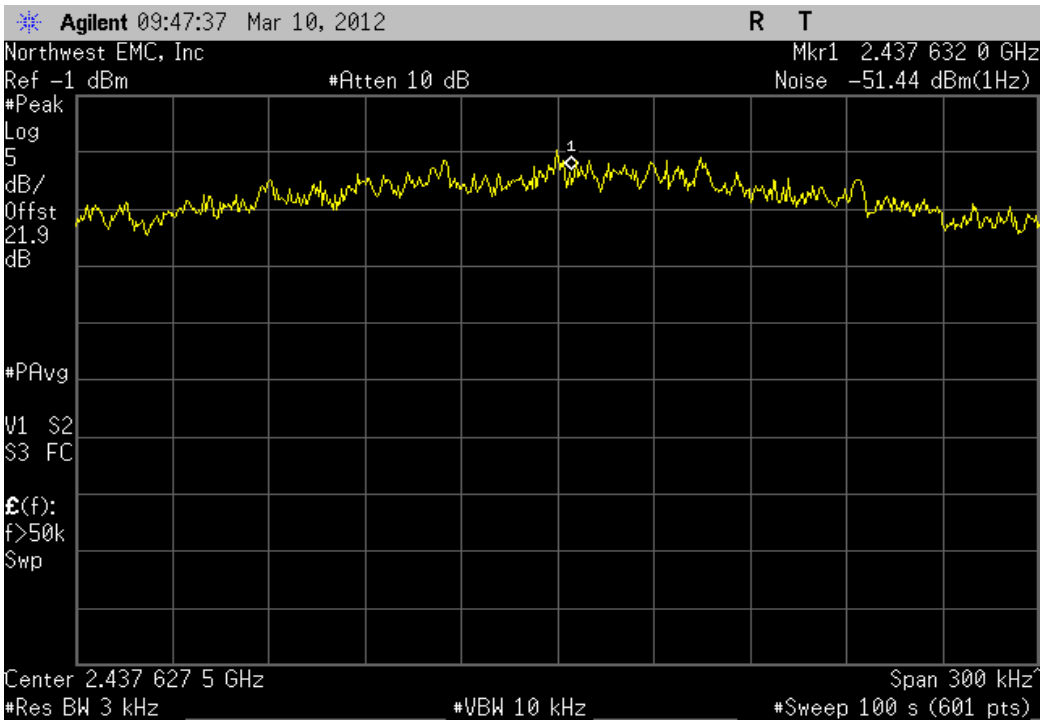
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-55.469	34.8	-20.669	8	Pass



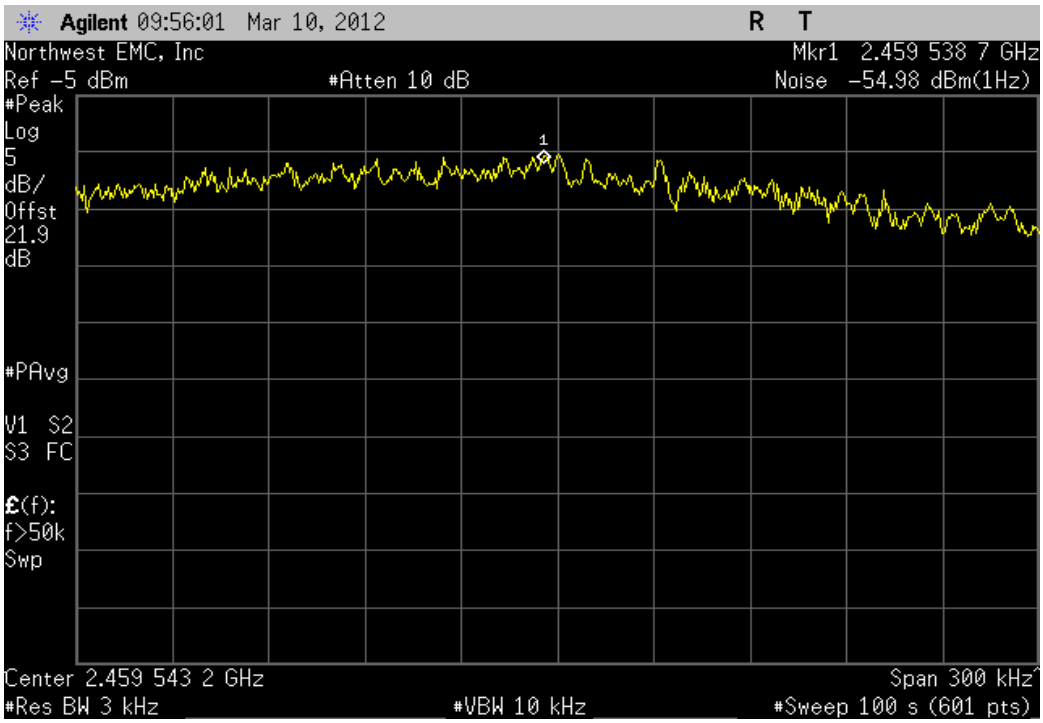
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-56.083	34.8	-21.283	8	Pass



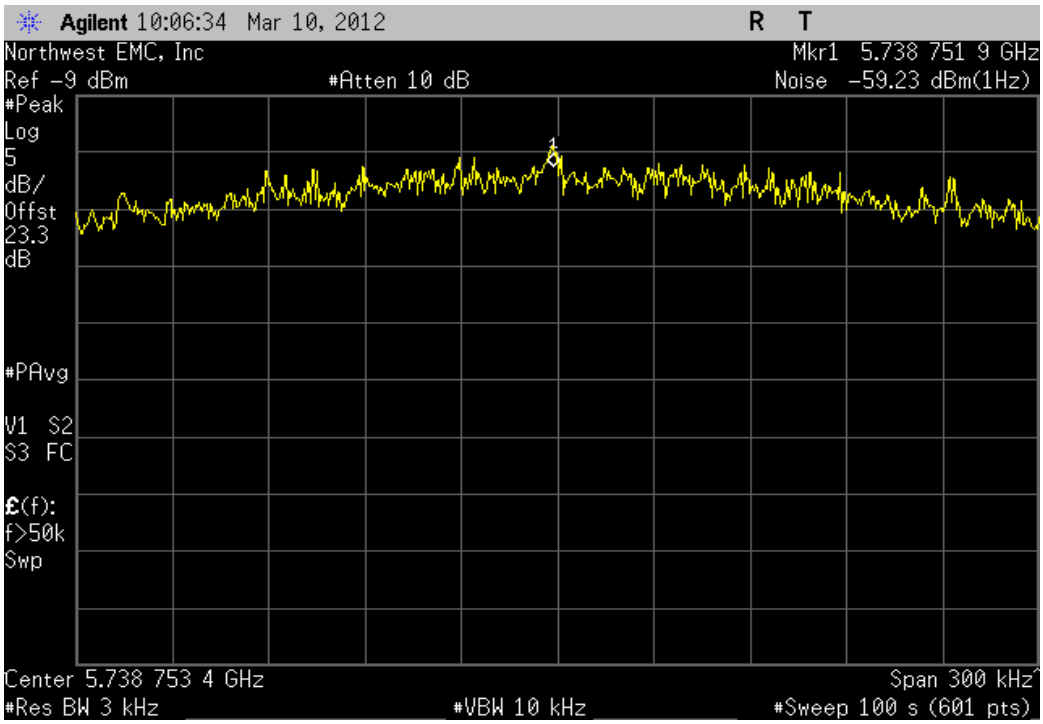
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-51.437	34.8	-16.637	8	Pass



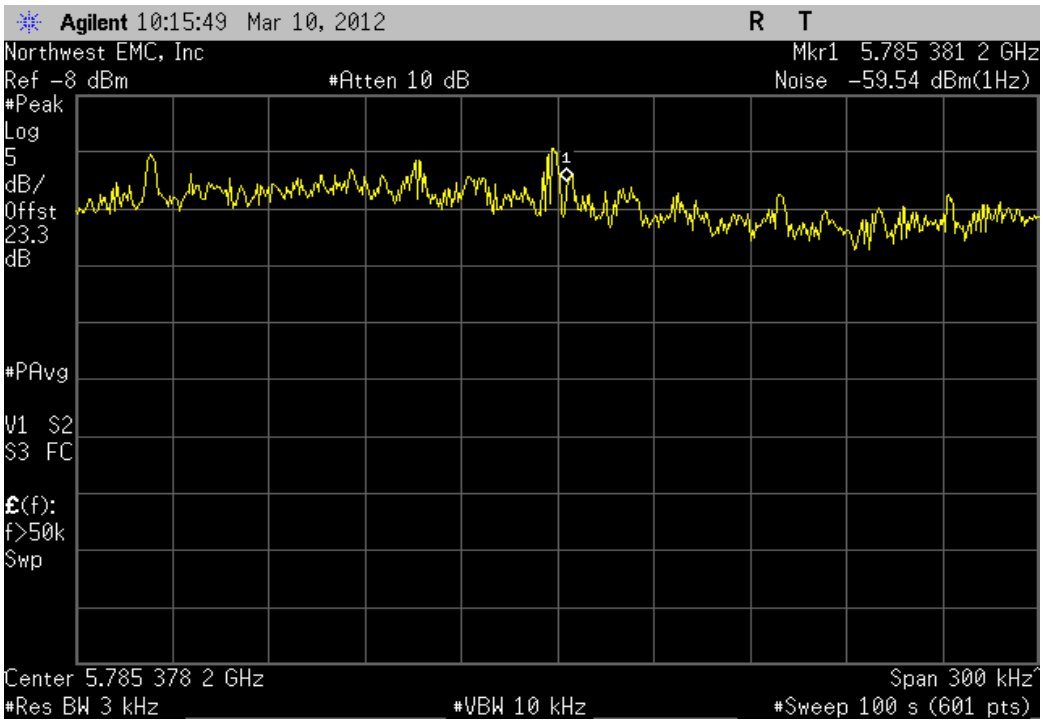
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-54.982	34.8	-20.182	8	Pass



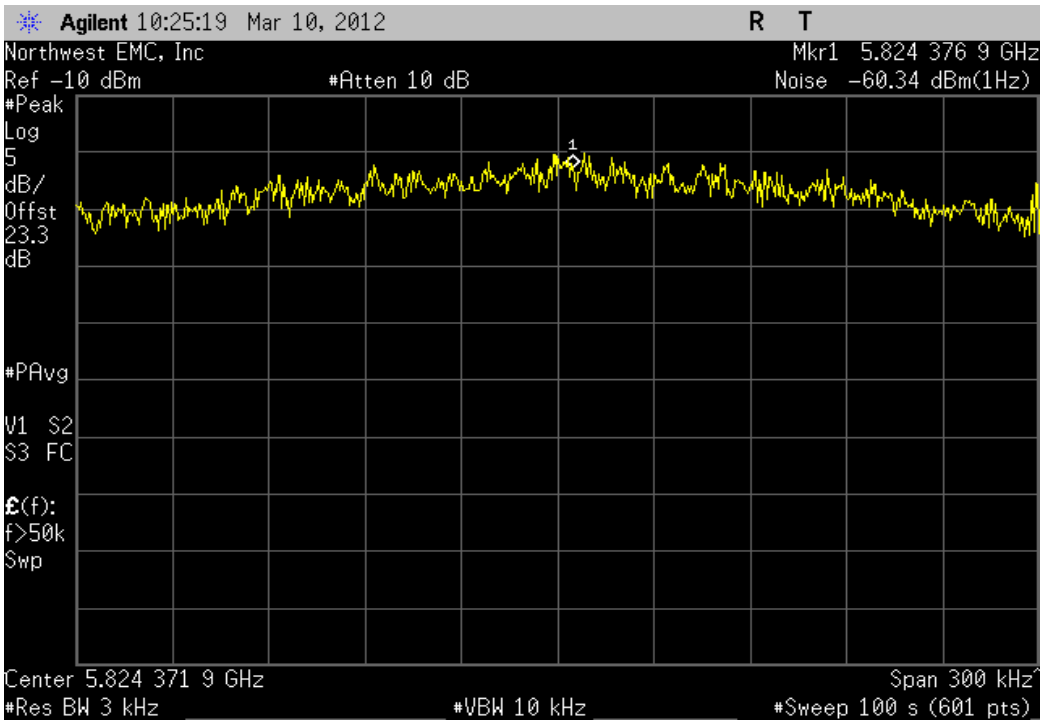
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Low Channel 149, 5745 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-59.229	34.8	-24.429	8	Pass



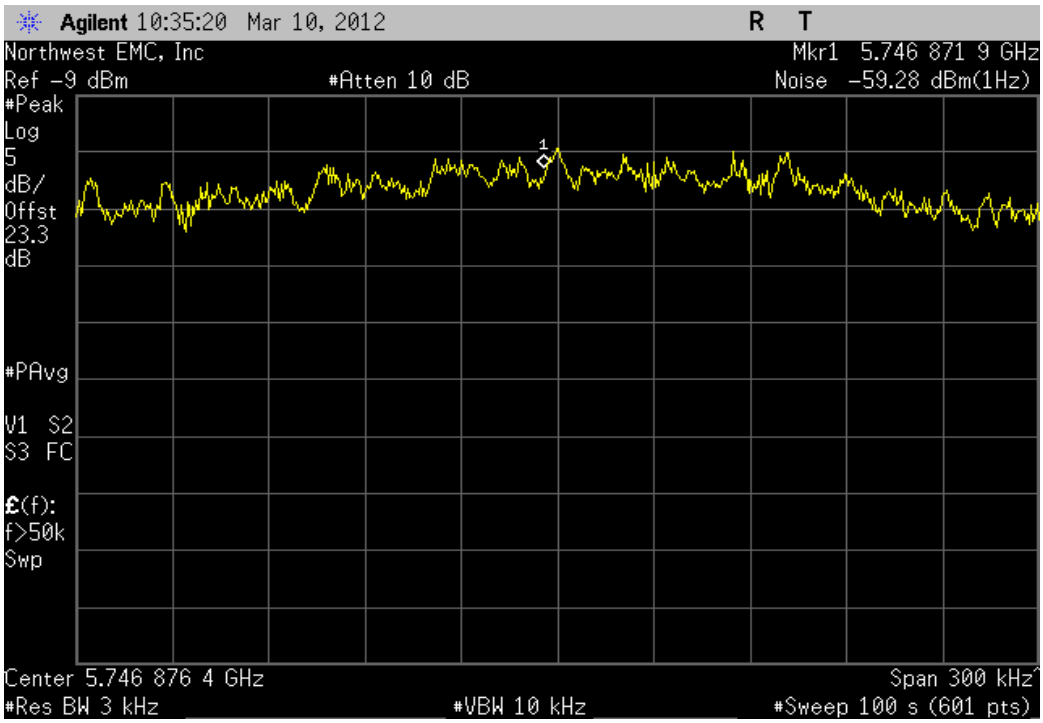
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, Mid Channel 157, 5785 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-59.54	34.8	-24.74	8	Pass



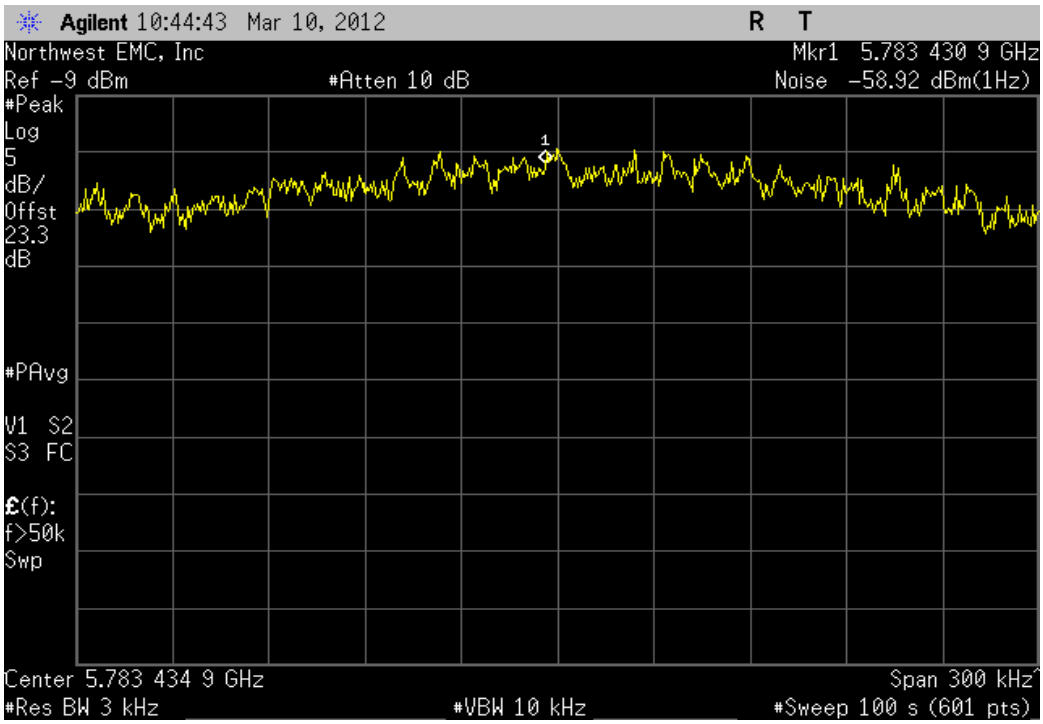
5725 MHz - 5850 MHz Band, 802.11(a) 6 Mbps, High Channel 165, 5825 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-60.337	34.8	-25.537	8	Pass



5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Low Channel 149, 5745 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-59.275	34.8	-24.475	8	Pass

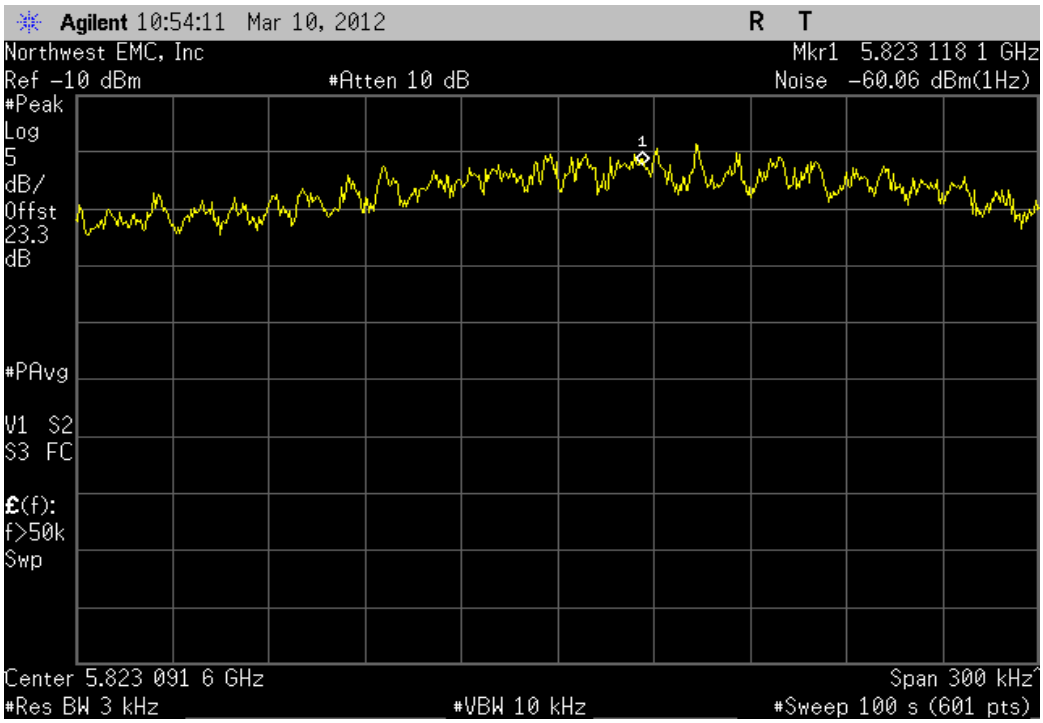


5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, Mid Channel 157, 5785 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-58.924	34.8	-24.124	8	Pass

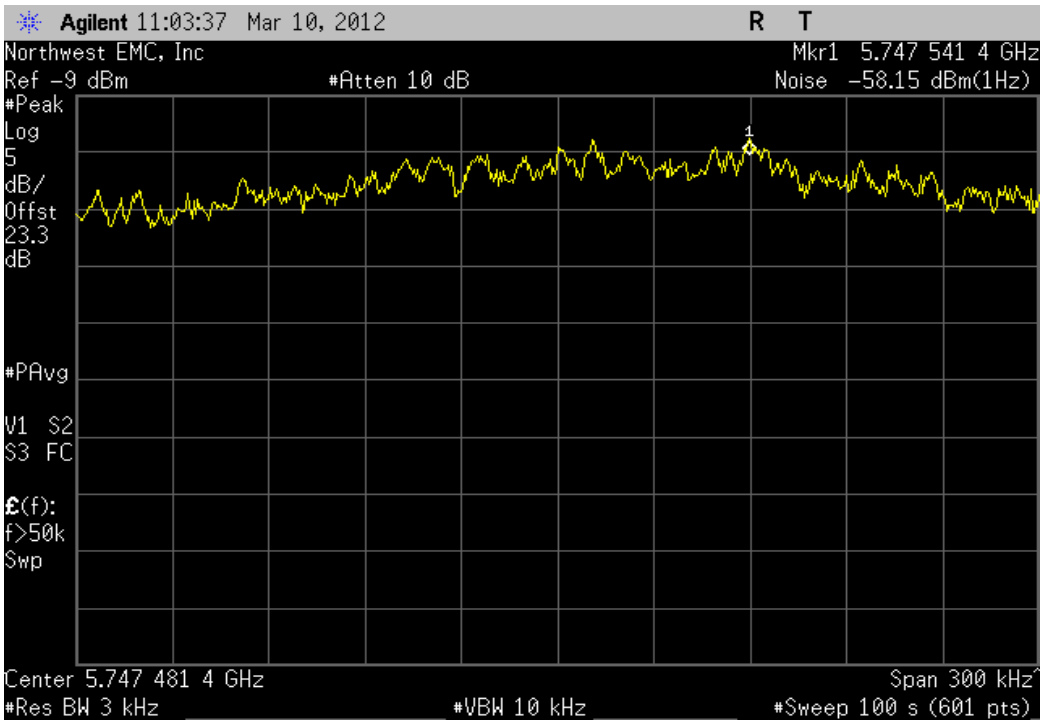


Power Spectral Density

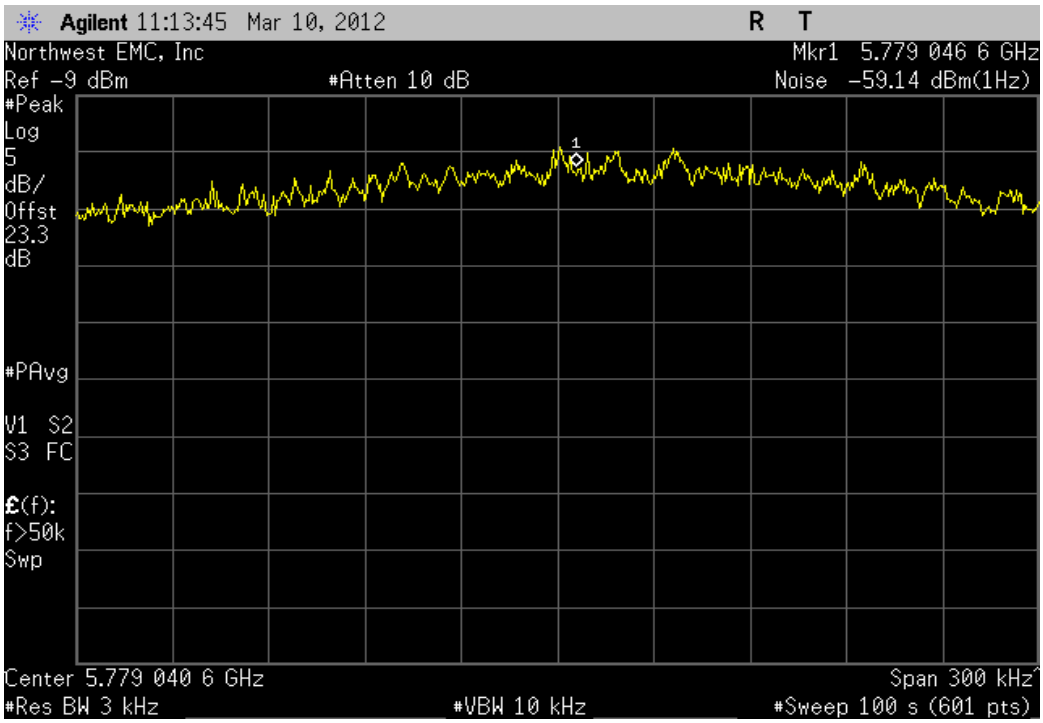
5725 MHz - 5850 MHz Band, 802.11(a) 36 Mbps, High Channel 165, 5825 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-60.056	34.8	-25.256	8	Pass



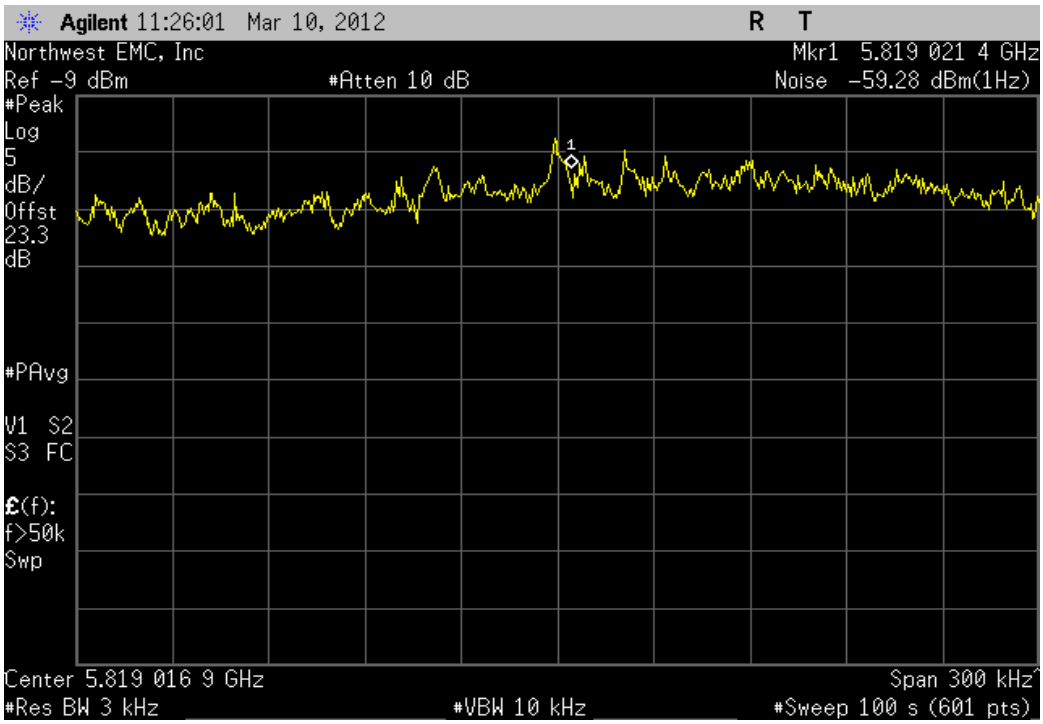
5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Low Channel 149, 5745 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-58.147	34.8	-23.347	8	Pass



5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, Mid Channel 157, 5785 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-59.139	34.8	-24.339	8	Pass



5725 MHz - 5850 MHz Band, 802.11(a) 54 Mbps, High Channel 165, 5825 MHz						
		Value (dBm / Hz)	(dBm / Hz) To (dBm / 3 kHz)	Value (dBm / 3 kHz)	Limit (dBm / 3 kHz)	Result
		-59.278	34.8	-24.478	8	Pass



Spurious Radiated Emissions

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Transmitting at 100% duty cycle. Ch 149, 157, 165 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 50 (see comments).

Transmitting at 100% duty cycle. Ch 1, 6, 11 at 1 Mbps, 11 Mbps and Ch 6 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 60. Channel 1 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 45. Channel 11 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 50 (see comments).

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

DGII0053 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	40 GHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator, 20 dB, 'SMA'	SM Electronics	SA6-20	REO	7/1/2011	12 mo
High Pass Filter 2.8-18 GHz	Micro-Tronics	HPM50111	HGY	11/5/2010	24 mo
5G Notch Filter	Micro-Tronics	BRC50705	HGZ	6/2/2011	24 mo
Signal Generator	Agilent	N5183A	TIA	1/27/2012	12 mo
Antenna, Horn	ETS	3115	AJA	5/13/2011	24 mo
Low Pass Filter	Micro-Tronics	LPM50004	HGK	7/9/2010	24 mo
Pre-Amplifier	Miteq	JSW45-26004000-40-5P	AVN	10/12/2011	12 mo
26-40GHz Cable	N/A	TTBJ141-KMKM-72	EVX	10/12/2011	12 mo
Antenna, Horn	ETS	3160-10	AIC	NCR	0 mo
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	2/6/2012	12 mo
MN05 Cables	N/A	18-26GHz Standard Gain Horn Cable	EVD	2/6/2012	12 mo
Antenna, Horn	ETS	3160-09	AHG	NCR	0 mo
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	7/1/2011	12 mo
Antenna, Horn	ETS Lindgren	3160-08	AIQ	NCR	0 mo
MN05 Cables	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	7/1/2011	12 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	7/1/2011	12 mo
Antenna, Horn	ETS	3160-07	AXP	NCR	0 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	7/1/2011	12 mo
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	10/18/2011	12 mo
Antenna, Horn (DRG)	ETS Lindgren	3115	AIP	6/29/2011	24 mo
Pre-Amplifier	Miteq	AM-1616-1000	AVY	7/1/2011	12 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	1/24/2012	12 mo
Antenna X-Wing Bilog 30MHZ-2GHz	Teseq	CBL 6141B	AYD	12/19/2011	12 mo
Spectrum Analyzer	Agilent	E4446A	AAT	3/2/2012	12 mo

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

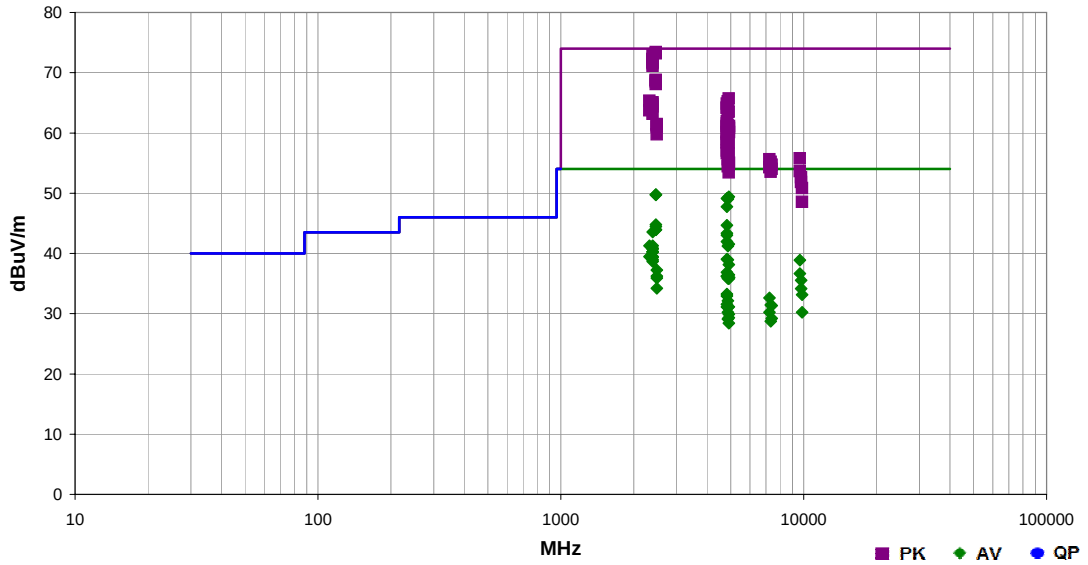
A duty cycle correction factor was applied to the average data. The customer states that the EUT will be limited by packet size and duty cycle. The worst case data rate was used to calculate the DCCF. DCCF = 20 * Log(Tx on time in 100ms/100m)

Spurious Radiated Emissions

Work Order:	DGII0053	**Date:**	03/16/12	Trevor Buls	
Project:	None	**Temperature:**	22.43 °C		
Job Site:	MN05	**Humidity:**	25.46% RH		
Serial Number:	7.06	**Barometric Pres.:**	1014.2 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	1				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting at 100% duty cycle. Ch 1, 6, 11 at 1 Mbps, 11 Mbps and Ch 6 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 60. Channel 1 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 45. Channel 11 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 50 (see comments).				
Deviations:	None				
Comments:	Customer requested increased table height to simulate normal operation. Added second harmonic filter on 5GHz path (footprint exists on board for this filter). DCCF = 20 * Log (8.381ms * 2 / 100ms) = 15.5 dB				

Test Specifications	**Test Method**
FCC 15.247:2012	ANSI C63.10:2009

Run #	34	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2465.053	92.4	-3.5	1.0	46.0		20.0	Vert	PK	0.0	73.4	74.0	-0.6	Ch 11, 6Mbps, EUT on Side, Pwr lvl 50, MD
2459.360	92.2	-3.6	1.0	149.0		20.0	Horz	PK	0.0	73.2	74.0	-0.8	Ch 11, 6Mbps, EUT on Side, Pwr lvl 50, MD
2388.158	56.8	-3.7	1.0	82.0		20.0	Horz	PK	0.0	73.1	74.0	-0.9	Ch 1, 6Mbps, EUT on Side, Pwr lvl 45
2389.133	56.0	-3.7	1.0	82.0		20.0	Horz	PK	0.0	72.3	74.0	-1.7	Ch 1, 54Mbps, EUT on Side, Pwr lvl 45
2389.147	56.0	-3.7	1.0	82.0		20.0	Horz	PK	0.0	72.3	74.0	-1.7	Ch 1, 36Mbps, EUT on Side, Pwr lvl 45
2389.542	55.5	-3.7	1.0	50.0		20.0	Vert	PK	0.0	71.8	74.0	-2.2	Ch 1, 54Mbps, EUT on Side, Pwr lvl 45
2389.883	55.3	-3.7	1.0	18.0		20.0	Vert	PK	0.0	71.6	74.0	-2.4	Ch 1, 6Mbps, EUT on Side, Pwr lvl 45
2390.000	54.9	-3.7	1.0	194.0		20.0	Vert	PK	0.0	71.2	74.0	-2.8	Ch 1, 36Mbps, EUT on Side, Pwr lvl 45
2461.300	84.3	-3.6	1.0	149.0	15.5	20.0	Horz	AV	0.0	49.8	54.0	-4.2	Ch 11, 6Mbps, EUT on Side, Pwr lvl 50, MD
2463.613	84.2	-3.5	1.0	46.0	15.5	20.0	Vert	AV	0.0	49.7	54.0	-4.3	Ch 11, 6Mbps, EUT on Side, Pwr lvl 50, MD
4924.000	60.1	4.8	1.0	71.0	15.5	0.0	Horz	AV	0.0	49.4	54.0	-4.6	Ch 11, 1Mbps, EUT on Side
4823.992	60.2	4.4	1.0	34.0	15.5	0.0	Horz	AV	0.0	49.1	54.0	-4.9	Ch 1, 1Mbps, EUT on Side
4873.975	59.9	4.6	1.0	70.0	15.5	0.0	Horz	AV	0.0	49.0	54.0	-5.0	Ch 6, 1Mbps, EUT on Side
2465.400	93.2	-3.5	1.0	46.0		20.0	Vert	PK	0.0	68.8	74.0	-5.2	Ch 11, 54Mbps, EUT on Side, Pwr lvl 50, MD
2459.862	93.2	-3.6	1.0	149.0		20.0	Horz	PK	0.0	68.7	74.0	-5.3	Ch 11, 54Mbps, EUT on Side, Pwr lvl 50, MD
2461.267	93.4	-3.6	1.0	149.0		20.0	Horz	PK	0.0	68.5	74.0	-5.5	Ch 11, 36Mbps, EUT on Side, Pwr lvl 50, MD
2463.053	93.0	-3.5	1.0	46.0		20.0	Vert	PK	0.0	68.1	74.0	-5.9	Ch 11, 36Mbps, EUT on Side, Pwr lvl 50, MD
4823.992	58.8	4.4	1.0	58.0	15.5	0.0	Vert	AV	0.0	47.7	54.0	-6.3	Ch 1, 1Mbps, EUT Vertical
4923.975	60.9	4.8	1.0	71.0		0.0	Horz	PK	0.0	65.7	74.0	-8.3	Ch 11, 1Mbps, EUT on Side
2317.179	48.7	-3.3	1.0	70.0		20.0	Horz	PK	0.0	65.4	74.0	-8.6	Ch 6, 1Mbps, EUT on Side
4873.983	60.6	4.6	1.0	70.0		0.0	Horz	PK	0.0	65.2	74.0	-8.8	Ch 6, 1Mbps, EUT on Side
2385.642	48.8	-3.7	1.0	149.0		20.0	Horz	PK	0.0	65.1	74.0	-8.9	Ch 1, 1Mbps, EUT on Side, Pwr lvl 60
4823.983	60.4	4.4	1.0	34.0		0.0	Horz	PK	0.0	64.8	74.0	-9.2	Ch 1, 1Mbps, EUT on Side
2385.142	48.5	-3.7	1.1	73.0		20.0	Horz	PK	0.0	64.8	74.0	-9.2	Ch 1, 11Mbps, EUT on Side, Pwr lvl 60
2461.300	84.7	-3.6	1.0	149.0	15.5	20.0	Horz	AV	0.0	44.8	54.0	-9.2	Ch 11, 54Mbps, EUT on Side, Pwr lvl 50, MD
4824.000	55.7	4.4	1.0	81.0	15.5	0.0	Horz	AV	0.0	44.6	54.0	-9.4	Ch 1, 1Mbps, EUT Horizontal
2463.480	84.4	-3.5	1.0	46.0	15.5	20.0	Vert	AV	0.0	44.5	54.0	-9.5	Ch 11, 54Mbps, EUT on Side, Pwr lvl 50, MD
2385.325	48.1	-3.7	1.1	38.0		20.0	Vert	PK	0.0	64.4	74.0	-9.6	Ch 1, 11Mbps, EUT on Side, Pwr lvl 60
4824.117	59.7	4.4	1.0	58.0		0.0	Vert	PK	0.0	64.1	74.0	-9.9	Ch 1, 1Mbps, EUT Vertical
4823.917	59.7	4.4	1.0	70.0		0.0	Horz	PK	0.0	64.1	74.0	-9.9	Ch 1, 11Mbps, EUT on Side
2464.680	84.3	-3.5	1.0	46.0	15.5	20.0	Vert	AV	0.0	43.9	54.0	-10.1	Ch 11, 36Mbps, EUT on Side, Pwr lvl 50, MD
2460.967	84.3	-3.6	1.0	149.0	15.5	20.0	Horz	AV	0.0	43.9	54.0	-10.1	Ch 11, 36Mbps, EUT on Side, Pwr lvl 50, MD
2317.017	47.1	-3.3	1.1	35.0		20.0	Vert	PK	0.0	63.8	74.0	-10.2	Ch 6, 1Mbps, EUT on Side

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2386.092	42.8	-3.7	1.0	149.0	15.5	20.0	Horz	AV	0.0	43.6	54.0	-10.4	Ch 1, 1Mbps, EUT on Side, Pwr lvl 60
4924.067	58.7	4.8	1.0	40.0		0.0	Horz	PK	0.0	63.5	74.0	-10.5	Ch 11, 11Mbps, EUT on Side
4873.958	58.8	4.6	1.0	35.0		0.0	Horz	PK	0.0	63.4	74.0	-10.6	Ch 6, 11Mbps, EUT on Side
4823.992	54.4	4.4	1.0	192.0	15.5	0.0	Horz	AV	0.0	43.3	54.0	-10.7	Ch 1, 1Mbps, EUT Vertical
2385.442	46.9	-3.7	1.0	80.0		20.0	Vert	PK	0.0	63.2	74.0	-10.8	Ch 1, 1Mbps, EUT on Side, Pwr lvl 60
4823.992	54.1	4.4	1.0	100.0	15.5	0.0	Vert	AV	0.0	43.0	54.0	-11.0	Ch 1, 1Mbps, EUT on Side
4824.008	53.0	4.4	1.0	96.0	15.5	0.0	Vert	AV	0.0	41.9	54.0	-12.1	Ch 1, 1Mbps, EUT Horizontal
4822.633	57.5	4.4	1.0	38.0		0.0	Horz	PK	0.0	61.9	74.0	-12.1	Ch 1, 36Mbps, EUT on Side
4824.742	57.1	4.5	1.0	36.0		0.0	Horz	PK	0.0	61.6	74.0	-12.4	Ch 1, 6Mbps, EUT on Side
4924.008	52.2	4.8	1.4	133.0	15.5	0.0	Vert	AV	0.0	41.5	54.0	-12.5	Ch 11, 1Mbps, EUT on Side
2486.342	44.9	-3.5	1.0	44.0		20.0	Vert	PK	0.0	61.4	74.0	-12.6	Ch 11, 11Mbps, EUT on Side, Pwr lvl 60
2488.217	44.8	-3.4	1.0	149.0		20.0	Horz	PK	0.0	61.4	74.0	-12.6	Ch 11, 1Mbps, EUT on Side, Pwr lvl 60
2390.000	40.5	-3.7	1.0	82.0	15.5	20.0	Horz	AV	0.0	41.3	54.0	-12.7	Ch 1, 6Mbps, EUT on Side, Pwr lvl 45
2317.454	40.1	-3.3	1.0	70.0	15.5	20.0	Horz	AV	0.0	41.3	54.0	-12.7	Ch 6, 1Mbps, EUT on Side
4875.617	56.6	4.6	1.0	70.0		0.0	Horz	PK	0.0	61.2	74.0	-12.8	Ch 6, 36Mbps, EUT on Side
4874.000	52.1	4.6	1.0	131.0	15.5	0.0	Vert	AV	0.0	41.2	54.0	-12.8	Ch 6, 1Mbps, EUT on Side
4824.042	56.7	4.4	1.0	81.0		0.0	Horz	PK	0.0	61.1	74.0	-12.9	Ch 1, 1Mbps, EUT Horizontal
4927.058	56.3	4.8	1.0	73.0		0.0	Horz	PK	0.0	61.1	74.0	-12.9	Ch 11, 6Mbps, EUT on Side
2488.000	44.5	-3.4	1.9	45.0		20.0	Vert	PK	0.0	61.1	74.0	-12.9	Ch 11, 1Mbps, EUT on Side, Pwr lvl 60
4822.642	56.6	4.4	1.0	34.0		0.0	Horz	PK	0.0	61.0	74.0	-13.0	Ch 1, 54Mbps, EUT on Side
4875.675	56.4	4.6	1.0	70.0		0.0	Horz	PK	0.0	61.0	74.0	-13.0	Ch 6, 6Mbps, EUT on Side
2386.200	40.1	-3.7	1.0	80.0	15.5	20.0	Vert	AV	0.0	40.9	54.0	-13.1	Ch 1, 1Mbps, EUT on Side, Pwr lvl 60
4925.508	56.0	4.8	1.0	69.0		0.0	Horz	PK	0.0	60.8	74.0	-13.2	Ch 11, 54Mbps, EUT on Side
2390.000	40.0	-3.7	1.0	82.0	15.5	20.0	Horz	AV	0.0	40.8	54.0	-13.2	Ch 1, 54Mbps, EUT on Side, Pwr lvl 45
4875.400	56.1	4.6	1.0	71.0		0.0	Horz	PK	0.0	60.7	74.0	-13.3	Ch 6, 54Mbps, EUT on Side
2389.975	39.5	-3.7	1.0	82.0	15.5	20.0	Horz	AV	0.0	40.3	54.0	-13.7	Ch 1, 6Mbps, EUT on Side, Pwr lvl 45
2389.967	39.5	-3.7	1.0	82.0	15.5	20.0	Horz	AV	0.0	40.3	54.0	-13.7	Ch 1, 36Mbps, EUT on Side, Pwr lvl 45
2389.983	39.5	-3.7	1.0	50.0	15.5	20.0	Vert	AV	0.0	40.3	54.0	-13.7	Ch 1, 54Mbps, EUT on Side, Pwr lvl 45
4823.900	55.7	4.4	1.0	192.0		0.0	Horz	PK	0.0	60.1	74.0	-13.9	Ch 1, 1Mbps, EUT Vertical
4928.392	55.3	4.8	1.0	72.0		0.0	Horz	PK	0.0	60.1	74.0	-13.9	Ch 11, 36Mbps, EUT on Side
4824.042	55.4	4.4	1.0	100.0		0.0	Vert	PK	0.0	59.8	74.0	-14.2	Ch 1, 11Mbps, EUT on Side
2487.875	43.2	-3.4	1.6	73.0		20.0	Horz	PK	0.0	59.8	74.0	-14.2	Ch 11, 11Mbps, EUT on Side, Pwr lvl 60
2386.525	38.7	-3.7	1.1	73.0	15.5	20.0	Horz	AV	0.0	39.5	54.0	-14.5	Ch 1, 11Mbps, EUT on Side, Pwr lvl 60
2317.484	38.3	-3.3	1.1	35.0	15.5	20.0	Vert	AV	0.0	39.5	54.0	-14.5	Ch 6, 1Mbps, EUT on Side
2389.992	38.6	-3.7	1.0	194.0	15.5	20.0	Vert	AV	0.0	39.4	54.0	-14.6	Ch 1, 36Mbps, EUT on Side, Pwr lvl 45
4823.700	50.1	4.4	1.0	70.0	15.5	0.0	Horz	AV	0.0	39.0	54.0	-15.0	Ch 1, 11Mbps, EUT on Side
2390.000	38.2	-3.7	1.0	18.0	15.5	20.0	Vert	AV	0.0	39.0	54.0	-15.0	Ch 1, 6Mbps, EUT on Side, Pwr lvl 45
4824.092	54.5	4.4	1.0	96.0		0.0	Vert	PK	0.0	58.9	74.0	-15.1	Ch 1, 1Mbps, EUT Horizontal
4873.975	49.8	4.6	1.0	35.0	15.5	0.0	Horz	AV	0.0	38.9	54.0	-15.1	Ch 6, 11Mbps, EUT on Side
9647.990	63.9	-9.5	1.1	28.0	15.5	0.0	Vert	AV	0.0	38.9	54.0	-15.1	Ch 1, 1Mbps, EUT on Side
2386.233	37.9	-3.7	1.1	38.0	15.5	20.0	Vert	AV	0.0	38.7	54.0	-15.3	Ch 1, 11Mbps, EUT on Side, Pwr lvl 60
4824.800	54.1	4.5	1.1	130.0		0.0	Vert	PK	0.0	58.6	74.0	-15.4	Ch 1, 6Mbps, EUT on Side
4923.917	53.6	4.8	1.4	133.0		0.0	Vert	PK	0.0	58.4	74.0	-15.6	Ch 11, 1Mbps, EUT on Side
4824.142	53.9	4.4	1.0	102.0		0.0	Vert	PK	0.0	58.3	74.0	-15.7	Ch 1, 1Mbps, EUT on Side
4874.117	53.6	4.6	1.0	131.0		0.0	Vert	PK	0.0	58.2	74.0	-15.8	Ch 6, 1Mbps, EUT on Side
4923.825	48.8	4.8	1.0	40.0	15.5	0.0	Horz	AV	0.0	38.1	54.0	-15.9	Ch 11, 11Mbps, EUT on Side
4874.158	52.8	4.6	1.5	136.0		0.0	Vert	PK	0.0	57.4	74.0	-16.6	Ch 6, 11Mbps, EUT on Side
2488.267	36.2	-3.4	1.0	149.0	15.5	20.0	Horz	AV	0.0	37.3	54.0	-16.7	Ch 11, 1Mbps, EUT on Side, Pwr lvl 60
4823.067	52.6	4.4	1.0	110.0		0.0	Vert	PK	0.0	57.0	74.0	-17.0	Ch 1, 54Mbps, EUT on Side
4873.683	52.4	4.6	1.3	81.0		0.0	Vert	PK	0.0	57.0	74.0	-17.0	Ch 6, 6Mbps, EUT on Side
4824.158	47.9	4.4	1.0	36.0	15.5	0.0	Horz	AV	0.0	36.8	54.0	-17.2	Ch 1, 6Mbps, EUT on Side
9648.000	61.7	-9.5	1.2	339.0	15.5	0.0	Horz	AV	0.0	36.7	54.0	-17.3	Ch 1, 1Mbps, EUT on Side
4825.158	52.2	4.5	1.0	105.0		0.0	Vert	PK	0.0	56.7	74.0	-17.3	Ch 1, 36Mbps, EUT on Side
4923.942	51.7	4.8	1.3	139.0		0.0	Vert	PK	0.0	56.5	74.0	-17.5	Ch 11, 11Mbps, EUT on Side
4924.358	47.1	4.8	1.0	69.0	15.5	0.0	Horz	AV	0.0	36.4	54.0	-17.6	Ch 11, 54Mbps, EUT on Side
2488.067	35.2	-3.4	1.9	45.0	15.5	20.0	Vert	AV	0.0	36.3	54.0	-17.7	Ch 11, 1Mbps, EUT on Side, Pwr lvl 60
4824.750	47.3	4.5	1.0	38.0	15.5	0.0	Horz	AV	0.0	36.3	54.0	-17.7	Ch 1, 36Mbps, EUT on Side
4822.125	47.3	4.4	1.0	34.0	15.5	0.0	Horz	AV	0.0	36.2	54.0	-17.8	Ch 1, 54Mbps, EUT on Side
4874.075	47.1	4.6	1.0	70.0	15.5	0.0	Horz	AV	0.0	36.2	54.0	-17.8	Ch 6, 6Mbps, EUT on Side
4874.500	46.9	4.6	1.0	70.0	15.5	0.0	Horz	AV	0.0	36.0	54.0	-18.0	Ch 6, 36Mbps, EUT on Side
4924.592	46.7	4.8	1.0	72.0	15.5	0.0	Horz	AV	0.0	36.0	54.0	-18.0	Ch 11, 36Mbps, EUT on Side
2483.517	34.9	-3.5	1.0	44.0	15.5	20.0	Vert	AV	0.0	35.9	54.0	-18.1	Ch 11, 11Mbps, EUT on Side, Pwr lvl 60
4873.525	46.7	4.6	1.0	71.0	15.5	0.0	Horz	AV	0.0	35.8	54.0	-18.2	Ch 6, 54Mbps, EUT on Side
4924.117	46.5	4.8	1.0	73.0	15.5	0.0	Horz	AV	0.0	35.8	54.0	-18.2	Ch 11, 6Mbps, EUT on Side
9648.040	65.3	-9.5	1.1	28.0		0.0	Vert	PK	0.0	55.8	74.0	-18.2	Ch 1, 1Mbps, EUT on Side
4873.058	51.0	4.6	1.0	131.0		0.0	Vert	PK	0.0	55.6	74.0	-18.4	Ch 6, 54Mbps, EUT on Side
7235.433	43.9	11.7	1.0	339.0		0.0	Horz	PK	0.0	55.6	74.0	-18.4	Ch 1, 1Mbps, EUT on Side
9747.976	60.3	-9.2	1.3	18.0	15.5	0.0	Vert	AV	0.0	35.6	54.0	-18.4	Ch 6, 1Mbps, EUT on Side
7312.092	43.1	12.1	1.7	338.0		0.0	Horz	PK	0.0	55.2	74.0	-18.8	Ch 6, 1Mbps, EUT on Side
4927.617	50.2	4.8	1.4	134.0		0.0	Vert	PK	0.0	55.0	74.0	-19.0	Ch 11, 36Mbps, EUT on Side
7387.058	42.3	12.4	1.8	340.0		0.0	Horz	PK	0.0	54.7	74.0	-19.3	Ch 11, 1Mbps, EUT on Side
4924.133	49.8	4.8	1.2	94.0		0.0	Vert	PK	0.0	54.6	74.0	-19.4	Ch 11, 6Mbps, EUT on Side
4873.100	49.8	4.6	1.4	126.0		0.0	Vert	PK	0.0	54.4	74.0	-19.6	Ch 6, 36Mbps, EUT on Side
7235.892	42.6	11.7	1.1	38.0		0.0	Vert	PK	0.0	54.3	74.0	-19.7	Ch 1, 1Mbps, EUT on Side
2483.508	33.2	-3.5	1.6	73.0	15.5	20.0	Horz	AV	0.0	34.2	54.0	-19.8	Ch 11, 11Mbps, EUT on Side, Pwr lvl 60
9748.001	58.9	-9.2	1.2	338.0	15.5	0.0	Horz	AV	0.0	34.2	54.0	-19.8	Ch 6, 1Mbps, EUT on Side
7386.758	41.6	12.4	1.0	40.0		0.0	Vert	PK	0.0	54.0	74.0	-20.0	Ch 11, 1Mbps, EUT on Side
9647.941	63.2	-9.5	1.2	339.0		0.0	Horz	PK	0.0	53.7	74.0	-20.3	Ch 1, 1Mbps, EUT on Side
7309.000	41.5	12.1	1.4	22.0		0.0	Vert	PK	0.0	53.6	74.0	-20.4	Ch 6, 1Mbps, EUT on Side
4923.867	48.6	4.8	1.0	100.0		0.0	Vert	PK	0.0	53.4	74.0	-20.6	Ch 11, 54Mbps, EUT on Side
4824.008	44.3	4.4	1.0	102.0	15.5	0.0	Vert	AV	0.0	33.2	54.0	-20.8	Ch 1, 11Mbps, EUT on Side
9847.995	57.6	-9.0	1.2	336.0	15.5	0.0	Horz	AV	0.0	33.1	54.0	-20.9	Ch 11, 1Mbps, EUT on Side
4824.150	44.0	4.4	1.1	130.0	15.5	0.0	Vert	AV	0.0	32.9	54.0	-21.1	Ch 1, 6Mbps, EUT on Side
9747.876	61.9	-9.2	1.3	18.0		0.0	Vert	PK	0.0	52.7	74.0	-21.3	Ch 6, 1Mbps, EUT on Side
7234.958	36.4	11.7	1.0	339.0	15.5	0.0	Horz	AV	0.0	32.6	54.0	-21.4	Ch 1, 1Mbps, EUT on Side
4874.050	43.0	4.6	1.5	136.0	15.5	0.0	Vert	AV	0.0	32.1	54.0	-21.9	Ch 6, 11Mbps, EUT on Side
9748.059	61.1	-9.2	1.2	338.0		0.0	Horz	PK	0.0	51.9	74.0	-22.1	Ch 6, 1Mbps, EUT on Side
4824.392	42.6	4.5	1.0	110.0	15.5	0.0	Vert	AV	0.0	31.6	54.0	-22.4	Ch 1, 54Mbps, EUT on Side
7310.150	34.9	12.1	1.7	338.0	15.5	0.0	Horz	AV	0.0	31.5	54.0	-22.5	Ch 6, 1Mbps, EUT on Side
7387.058	34.4	12.4	1.8	340.0	15.5	0.0	Horz	AV	0.0	31.3	54.0	-22.7	Ch 11, 1Mbps, EUT on Side
4821.642	42.2	4.4	1.0	105.0	15.5	0.0	Vert	AV	0.0	31.1	54.0	-22.9	Ch 1, 36Mbps, EUT on Side
4924.083	41.8	4.8	1.3	139.0	15.5	0.0	Vert	AV	0.0	31.1	54.0	-22.9	Ch 11, 11Mbps, EUT on Side
4874.075	41.9	4.6	1.3	81.0	15.5	0.0	Vert	AV	0.0	31.0	54.0	-23.0	Ch 6, 6Mbps, EUT on Side
9848.095	59.8	-9.0	1.2	336.0		0.0	Horz	PK	0.0	50.8	74.0	-23.2	Ch 11, 1Mbps, EUT on Side
9847.994	54.7	-9.0	1.1	34.0	15.5	0.0	Vert	AV	0.0	30.2	54.0	-23.8	Ch 11, 1Mbps, EUT on Side
4874.033	41.1	4.6	1.0	131.0	15.5	0.0	Vert	AV	0.0	30.2	54.0	-23.8	Ch 6, 54Mbps, EUT on Side
7236.917	34.0	11.7	1.1	38.0	15.5	0.0	Vert	AV	0.0	30.2	54.0	-23.8	Ch 1, 1Mbps, EUT on Side
4924.242	40.6	4.8	1.4	134.0	15.5	0.0	Vert	AV	0.0	29.9	54.0	-24.1	Ch 11, 36Mbps, EUT on Side
4924.175	40.0	4.8	1.2	94.0	15.5	0.0	Vert	AV	0.0	29.3	54.0	-24.7	Ch 11, 6Mbps, EUT on Side
7386.867	32.3	12.4	1.0	40.0	15.5	0.0	Vert	AV	0.0	29.2	54.0	-24.8	Ch 11, 1Mbps, EUT on Side
4872.083	40.0	4.6	1.4	126.0	15.5	0.0	Vert	AV	0.0	29.1	54.0	-24.9	Ch 6, 36Mbps, EUT on Side

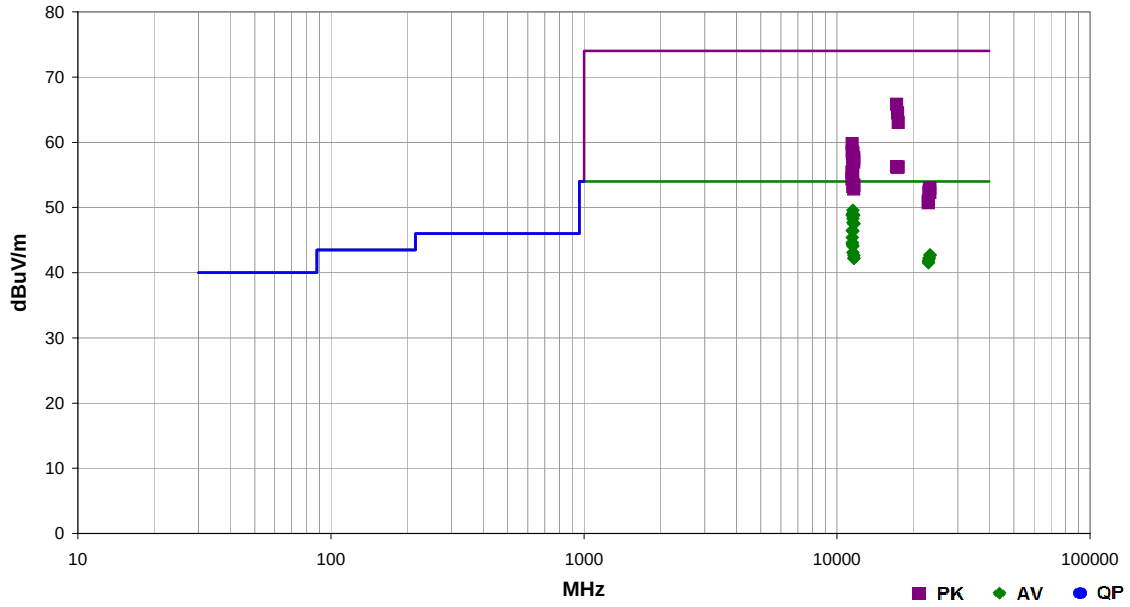
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7309.967	32.2	12.1	1.4	22.0	15.5	0.0	Vert	AV	0.0	28.8	54.0	-25.2	Ch 6, 1Mbps, EUT on Side
9847.894	57.5	-9.0	1.1	34.0		0.0	Vert	PK	0.0	48.5	74.0	-25.5	Ch 11, 1Mbps, EUT on Side
4924.167	39.1	4.8	1.0	100.0	15.5	0.0	Vert	AV	0.0	28.4	54.0	-25.6	Ch 11, 54Mbps, EUT on Side

Spurious Radiated Emissions

Work Order:	DGII0053	**Date:**	03/16/12	Trevor Buls	
Project:	None	**Temperature:**	22.43 °C		
Job Site:	MN05	**Humidity:**	25.46% RH		
Serial Number:	7.06	**Barometric Pres.:**	1014.2 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	1				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting at 100% duty cycle. Ch 149, 157, 165 at 6 Mbps, 36 Mbps, 54 Mbps: Power Level 50 (see comments).				
Deviations:	None				
Comments:	Customer requested increased table height to simulate normal operation. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

Test Specifications	**Test Method**
FCC 15.247:2012	ANSI C63.10:2009

Run #	31	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
11568.120	56.0	-6.4	1.0	48.0	3.0	0.0	Vert	AV	0.0	49.6	54.0	-4.4	Ch 157, 36Mbps, EUT Horizontal
11489.210	55.4	-6.4	1.2	43.0	3.0	0.0	Vert	AV	0.0	49.0	54.0	-5.0	Ch 149, 54Mbps, EUT Horizontal
11650.400	55.3	-6.5	1.2	42.0	3.0	0.0	Vert	AV	0.0	48.8	54.0	-5.2	Ch 165, 36Mbps, EUT Horizontal
11487.880	55.2	-6.4	1.2	50.0	3.0	0.0	Vert	AV	0.0	48.8	54.0	-5.2	Ch 149, 6Mbps, EUT Horizontal
11570.290	54.7	-6.4	1.2	51.0	3.0	0.0	Vert	AV	0.0	48.3	54.0	-5.7	Ch 157, 54Mbps, EUT Horizontal
11571.120	54.1	-6.4	1.2	54.0	3.0	0.0	Vert	AV	0.0	47.7	54.0	-6.3	Ch 157, 6Mbps, EUT Horizontal
11649.650	54.0	-6.5	1.1	38.0	3.0	0.0	Vert	AV	0.0	47.5	54.0	-6.5	Ch 165, 54Mbps, EUT Horizontal
11650.150	54.0	-6.5	1.2	29.0	3.0	0.0	Vert	AV	0.0	47.5	54.0	-6.5	Ch 165, 6Mbps, EUT Horizontal
11487.630	52.9	-6.4	1.2	55.0	3.0	0.0	Vert	AV	0.0	46.5	54.0	-7.5	Ch 149, 36Mbps, EUT Horizontal
11571.110	52.8	-6.4	1.2	79.0	3.0	0.0	Horz	AV	0.0	46.4	54.0	-7.6	Ch 157, 54Mbps, EUT Horizontal
17226.880	62.2	3.6	1.7	269.0	3.0	0.0	Vert	PK	0.0	65.8	74.0	-8.2	Ch 149, 6Mbps, EUT Horizontal
11487.690	51.8	-6.4	1.2	80.0	3.0	0.0	Horz	AV	0.0	45.4	54.0	-8.6	Ch 149, 54Mbps, EUT Horizontal
11491.030	51.0	-6.4	1.0	83.0	3.0	0.0	Horz	AV	0.0	44.6	54.0	-9.4	Ch 149, 6Mbps, EUT Horizontal
17352.530	61.0	3.5	1.7	292.0	3.0	0.0	Vert	PK	0.0	64.5	74.0	-9.5	Ch 157, 6Mbps, EUT Horizontal
11487.190	50.8	-6.4	1.2	80.0	3.0	0.0	Horz	AV	0.0	44.4	54.0	-9.6	Ch 149, 36Mbps, EUT Horizontal
11571.780	50.5	-6.4	1.2	67.0	3.0	0.0	Horz	AV	0.0	44.1	54.0	-9.9	Ch 157, 36Mbps, EUT Horizontal
11571.610	49.5	-6.4	1.1	79.0	3.0	0.0	Horz	AV	0.0	43.1	54.0	-10.9	Ch 157, 6Mbps, EUT Horizontal
17476.650	59.6	3.4	1.7	296.0	3.0	0.0	Vert	PK	0.0	63.0	74.0	-11.0	Ch 165, 6Mbps, EUT Horizontal
23297.420	30.4	12.3	1.2	359.0	3.0	0.0	Horz	AV	0.0	42.7	54.0	-11.3	Ch 165, 6Mbps, EUT Horizontal
23296.580	30.4	12.3	1.2	0.0	3.0	0.0	Vert	AV	0.0	42.7	54.0	-11.3	Ch 165, 6Mbps, EUT Horizontal
11647.630	49.1	-6.5	1.6	93.0	3.0	0.0	Horz	AV	0.0	42.6	54.0	-11.4	Ch 165, 36Mbps, EUT Horizontal
23133.330	30.0	12.2	1.2	0.0	3.0	0.0	Vert	AV	0.0	42.2	54.0	-11.8	Ch 157, 6Mbps, EUT Horizontal
11649.210	48.7	-6.5	1.2	66.0	3.0	0.0	Horz	AV	0.0	42.2	54.0	-11.8	Ch 165, 54Mbps, EUT Horizontal
11651.300	48.7	-6.5	1.2	93.0	3.0	0.0	Horz	AV	0.0	42.2	54.0	-11.8	Ch 165, 6Mbps, EUT Horizontal
23138.250	29.9	12.3	1.2	358.0	3.0	0.0	Horz	AV	0.0	42.2	54.0	-11.8	Ch 157, 6Mbps, EUT Horizontal
22981.330	29.6	12.2	1.2	0.0	3.0	0.0	Vert	AV	0.0	41.8	54.0	-12.2	Ch 149, 6Mbps, EUT Horizontal
23001.170	29.3	12.2	1.2	359.0	3.0	0.0	Horz	AV	0.0	41.5	54.0	-12.5	Ch 149, 6Mbps, EUT Horizontal

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
11489.540	66.2	-6.4	1.2	50.0	3.0	0.0	Vert	PK	0.0	59.8	74.0	-14.2	Ch 149, 6Mbps, EUT Horizontal
11481.130	65.0	-6.4	1.2	43.0	3.0	0.0	Vert	PK	0.0	58.6	74.0	-15.4	Ch 149, 54Mbps, EUT Horizontal
11563.620	64.8	-6.4	1.0	48.0	3.0	0.0	Vert	PK	0.0	58.4	74.0	-15.6	Ch 157, 36Mbps, EUT Horizontal
11565.790	64.7	-6.4	1.2	51.0	3.0	0.0	Vert	PK	0.0	58.3	74.0	-15.7	Ch 157, 54Mbps, EUT Horizontal
11565.360	64.1	-6.4	1.2	79.0	3.0	0.0	Horz	PK	0.0	57.7	74.0	-16.3	Ch 157, 54Mbps, EUT Horizontal
11650.980	64.1	-6.5	1.2	42.0	3.0	0.0	Vert	PK	0.0	57.6	74.0	-16.4	Ch 165, 36Mbps, EUT Horizontal
11567.540	63.8	-6.4	1.2	54.0	3.0	0.0	Vert	PK	0.0	57.4	74.0	-16.6	Ch 157, 6Mbps, EUT Horizontal
11654.980	63.8	-6.5	1.2	29.0	3.0	0.0	Vert	PK	0.0	57.3	74.0	-16.7	Ch 165, 6Mbps, EUT Horizontal
11653.650	63.4	-6.5	1.1	38.0	3.0	0.0	Vert	PK	0.0	56.9	74.0	-17.1	Ch 165, 54Mbps, EUT Horizontal
17225.270	52.6	3.6	1.7	263.0	3.0	0.0	Horz	PK	0.0	56.2	74.0	-17.8	Ch 149, 6Mbps, EUT Horizontal
17476.580	52.8	3.4	1.9	261.0	3.0	0.0	Horz	PK	0.0	56.2	74.0	-17.8	Ch 165, 6Mbps, EUT Horizontal
17339.800	52.6	3.5	1.7	261.0	3.0	0.0	Horz	PK	0.0	56.1	74.0	-17.9	Ch 157, 6Mbps, EUT Horizontal
11484.210	61.9	-6.4	1.2	55.0	3.0	0.0	Vert	PK	0.0	55.5	74.0	-18.5	Ch 149, 36Mbps, EUT Horizontal
11492.610	61.7	-6.4	1.0	83.0	3.0	0.0	Horz	PK	0.0	55.3	74.0	-18.7	Ch 149, 6Mbps, EUT Horizontal
11572.280	61.7	-6.4	1.1	79.0	3.0	0.0	Horz	PK	0.0	55.3	74.0	-18.7	Ch 157, 6Mbps, EUT Horizontal
11490.780	60.8	-6.4	1.2	80.0	3.0	0.0	Horz	PK	0.0	54.4	74.0	-19.6	Ch 149, 54Mbps, EUT Horizontal
11484.530	60.8	-6.4	1.2	80.0	3.0	0.0	Horz	PK	0.0	54.4	74.0	-19.6	Ch 149, 36Mbps, EUT Horizontal
11649.460	59.9	-6.5	1.2	93.0	3.0	0.0	Horz	PK	0.0	53.4	74.0	-20.6	Ch 165, 6Mbps, EUT Horizontal
11648.800	59.8	-6.5	1.6	93.0	3.0	0.0	Horz	PK	0.0	53.3	74.0	-20.7	Ch 165, 36Mbps, EUT Horizontal
11572.530	59.6	-6.4	1.2	67.0	3.0	0.0	Horz	PK	0.0	53.2	74.0	-20.8	Ch 157, 36Mbps, EUT Horizontal
23318.250	40.7	12.3	1.2	359.0	3.0	0.0	Horz	PK	0.0	53.0	74.0	-21.0	Ch 165, 6Mbps, EUT Horizontal
11649.210	59.3	-6.5	1.2	66.0	3.0	0.0	Horz	PK	0.0	52.8	74.0	-21.2	Ch 165, 54Mbps, EUT Horizontal
23151.420	40.4	12.3	1.2	358.0	3.0	0.0	Horz	PK	0.0	52.7	74.0	-21.3	Ch 157, 6Mbps, EUT Horizontal
23298.500	40.0	12.3	1.2	0.0	3.0	0.0	Vert	PK	0.0	52.3	74.0	-21.7	Ch 165, 6Mbps, EUT Horizontal
23137.080	40.0	12.3	1.2	0.0	3.0	0.0	Vert	PK	0.0	52.3	74.0	-21.7	Ch 157, 6Mbps, EUT Horizontal
22990.670	38.8	12.2	1.2	359.0	3.0	0.0	Horz	PK	0.0	51.0	74.0	-23.0	Ch 149, 6Mbps, EUT Horizontal
22996.920	38.5	12.2	1.2	0.0	3.0	0.0	Vert	PK	0.0	50.7	74.0	-23.3	Ch 149, 6Mbps, EUT Horizontal

AC POWERLINE CONDUCTED EMISSIONS

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION

Transmitting Ch. 165. 6Mbps. Power level 50
Transmitting Ch. 157. 6Mbps. Power level 50
Transmitting Ch. 149. 6Mbps. Power level 50
Transmitting Ch. 11. 1Mbps. Power level 60
Transmitting Ch. 6. 1Mbps. Power level 60
Transmitting Ch. 1. 1Mbps. Power level 60

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

DGII0053 - 2

SAMPLE CALCULATIONS

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
LISN	Solar	9252-50-R-24-BNC	LIQ	2/17/2012	12 mo
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	7/5/2011	12 mo
MN03 Cables	ESM Cable Corp.	Conducted Cables	MNC	5/18/2011	12 mo
High Pass Filter	TTE	H97-100K-50-720B	HGN	6/28/2010	24 mo
Spectrum Analyzer	Agilent	E4443A	AAS	3/17/2011	14 mo
Attenuator, 20 dB	SM Electronics	SA01B-20	REF	12/21/2011	12 mo

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Measurements were made using the bandwidths and detectors specified. No video filter was used.

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The EUT will be powered indirectly from the AC power line while operating in a host device. Therefore, conducted emissions measurements were made on the DC input of the EUT, or on the DC input of the device used to power the EUT. The AC power line conducted emissions were measured on a linear power supply providing DC power to the module while providing no filtering of the power inputs to the module.

The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band or bands. The EUT was transmitting in the mode which has the highest output power for the band. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.10-2009.

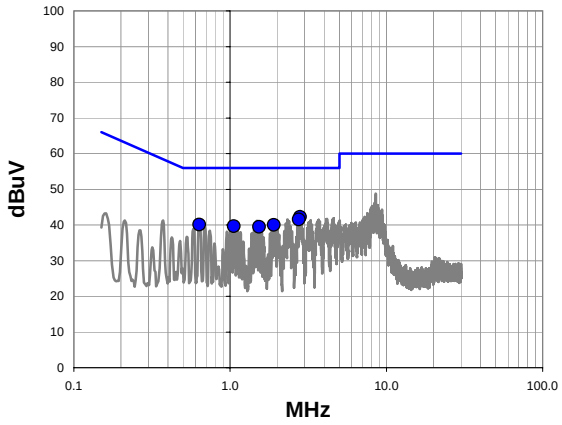
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 1. 1Mbps. Power level 60				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

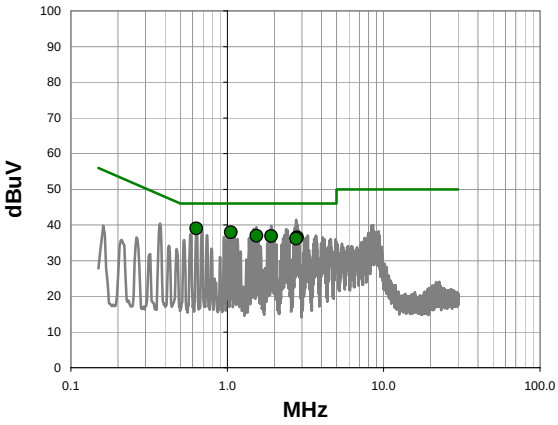
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	1	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.803	21.9	20.3	42.2	56.0	-13.8
2.756	21.2	20.3	41.5	56.0	-14.5
0.635	19.9	20.2	40.1	56.0	-15.9
1.907	19.7	20.3	40.0	56.0	-16.0
1.057	19.4	20.2	39.6	56.0	-16.4
1.535	19.2	20.3	39.5	56.0	-16.5

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.635	18.8	20.2	39.0	46.0	-7.0
1.057	17.7	20.2	37.9	46.0	-8.1
1.535	16.7	20.3	37.0	46.0	-9.0
1.907	16.6	20.3	36.9	46.0	-9.1
2.803	16.2	20.3	36.5	46.0	-9.5
2.756	15.8	20.3	36.1	46.0	-9.9

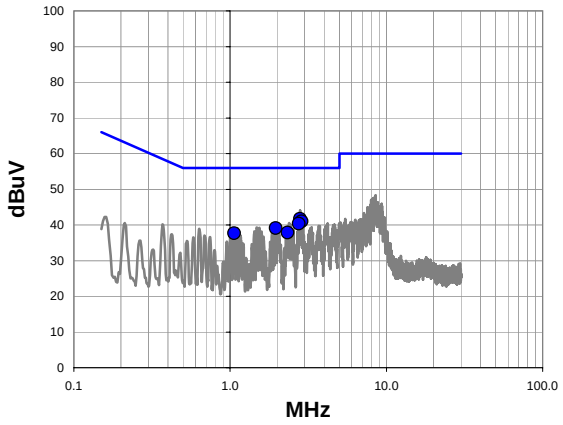
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 1. 1Mbps. Power level 60				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

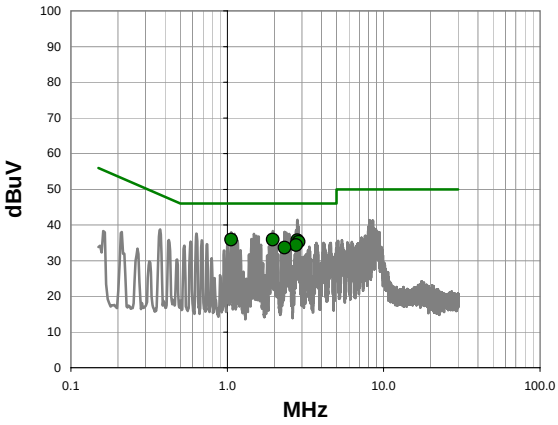
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	2	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.807	21.4	20.3	41.7	56.0	-14.3
2.865	20.7	20.3	41.0	56.0	-15.0
2.752	20.0	20.3	40.3	56.0	-15.7
1.958	18.8	20.3	39.1	56.0	-16.9
2.329	17.5	20.3	37.8	56.0	-18.2
1.061	17.5	20.2	37.7	56.0	-18.3

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
1.061	15.7	20.2	35.9	46.0	-10.1
1.958	15.6	20.3	35.9	46.0	-10.1
2.807	15.4	20.3	35.7	46.0	-10.3
2.865	14.9	20.3	35.2	46.0	-10.8
2.752	14.0	20.3	34.3	46.0	-11.7
2.329	13.3	20.3	33.6	46.0	-12.4

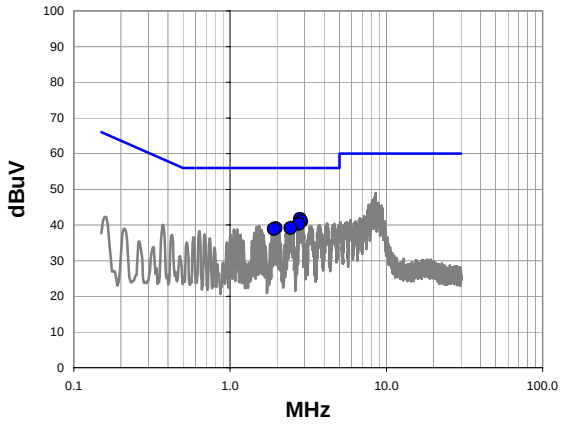
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 6. 1Mbps. Power level 60				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

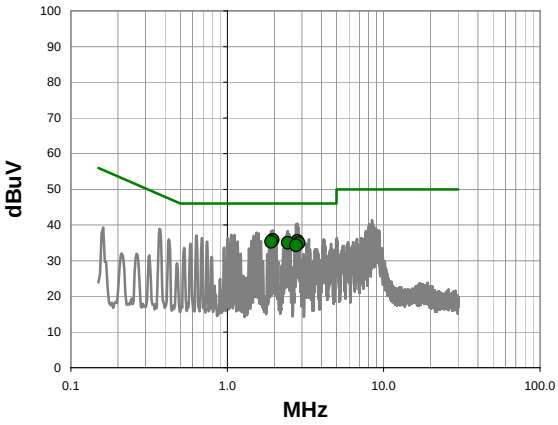
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	3	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.807	21.4	20.3	41.7	56.0	-14.3
2.861	20.7	20.3	41.0	56.0	-15.0
2.752	19.9	20.3	40.2	56.0	-15.8
2.435	18.8	20.3	39.1	56.0	-16.9
1.958	18.8	20.3	39.1	56.0	-16.9
1.907	18.5	20.3	38.8	56.0	-17.2

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
1.958	15.5	20.3	35.8	46.0	-10.2
2.807	15.2	20.3	35.5	46.0	-10.5
1.907	15.0	20.3	35.3	46.0	-10.7
2.435	14.7	20.3	35.0	46.0	-11.0
2.861	14.6	20.3	34.9	46.0	-11.1
2.752	13.9	20.3	34.2	46.0	-11.8

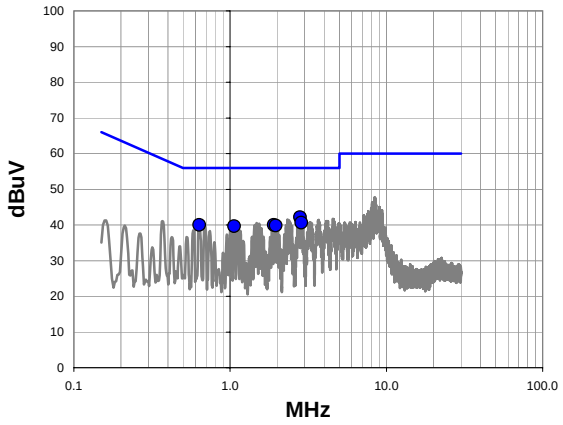
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 6. 1Mbps. Power level 60				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

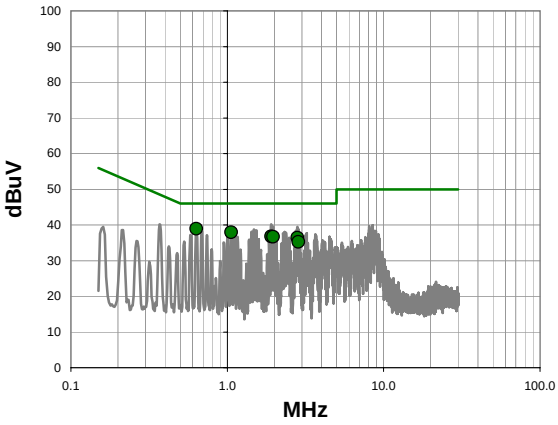
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	4	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.807	21.8	20.3	42.1	56.0	-13.9
2.854	20.3	20.3	40.6	56.0	-15.4
0.635	19.8	20.2	40.0	56.0	-16.0
1.907	19.7	20.3	40.0	56.0	-16.0
1.961	19.5	20.3	39.8	56.0	-16.2
1.061	19.4	20.2	39.6	56.0	-16.4

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.635	18.7	20.2	38.9	46.0	-7.1
1.061	17.7	20.2	37.9	46.0	-8.1
1.907	16.5	20.3	36.8	46.0	-9.2
1.961	16.4	20.3	36.7	46.0	-9.3
2.807	16.1	20.3	36.4	46.0	-9.6
2.854	14.9	20.3	35.2	46.0	-10.8

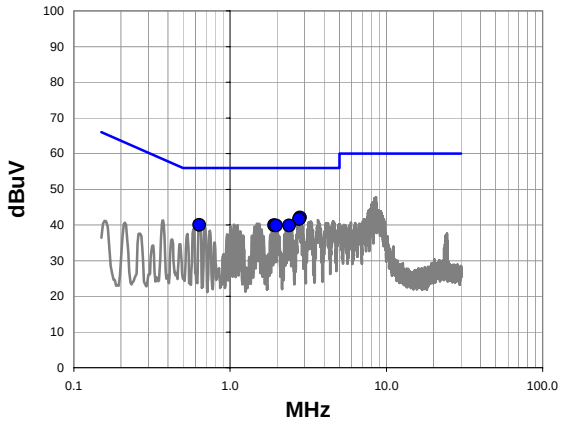
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 11. 1Mbps. Power level 60				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

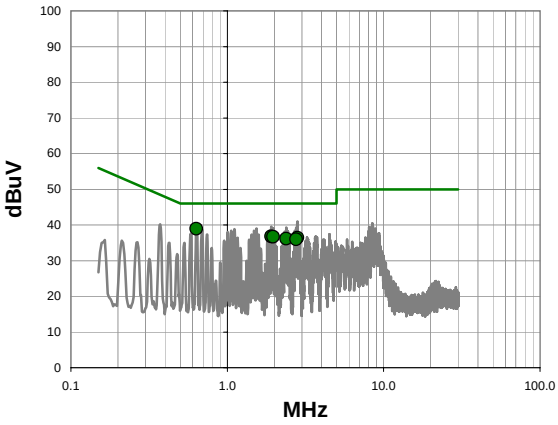
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	5	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.807	21.7	20.3	42.0	56.0	-14.0
2.759	21.3	20.3	41.6	56.0	-14.4
0.635	19.8	20.2	40.0	56.0	-16.0
1.910	19.6	20.3	39.9	56.0	-16.1
2.388	19.5	20.3	39.8	56.0	-16.2
1.965	19.5	20.3	39.8	56.0	-16.2

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.635	18.7	20.2	38.9	46.0	-7.1
1.910	16.5	20.3	36.8	46.0	-9.2
1.965	16.4	20.3	36.7	46.0	-9.3
2.807	16.1	20.3	36.4	46.0	-9.6
2.388	15.8	20.3	36.1	46.0	-9.9
2.759	15.6	20.3	35.9	46.0	-10.1

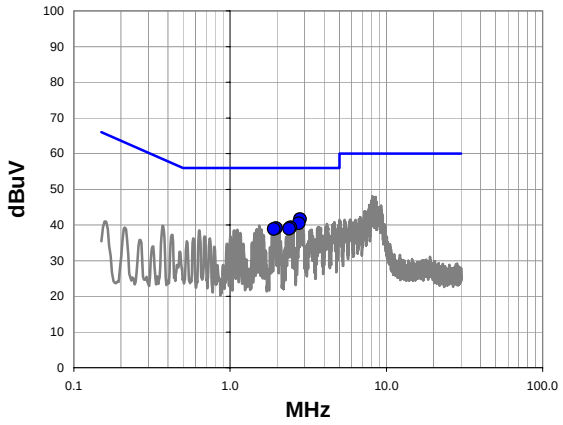
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 11. 1Mbps. Power level 60				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

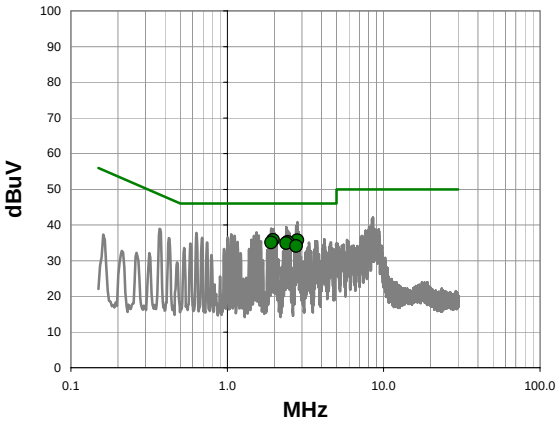
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	6	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.807	21.3	20.3	41.6	56.0	-14.4
2.756	20.1	20.3	40.4	56.0	-15.6
2.439	19.0	20.3	39.3	56.0	-16.7
1.965	18.8	20.3	39.1	56.0	-16.9
2.384	18.6	20.3	38.9	56.0	-17.1
1.907	18.5	20.3	38.8	56.0	-17.2

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
1.965	15.5	20.3	35.8	46.0	-10.2
2.807	15.4	20.3	35.7	46.0	-10.3
2.439	14.9	20.3	35.2	46.0	-10.8
1.907	14.8	20.3	35.1	46.0	-10.9
2.384	14.6	20.3	34.9	46.0	-11.1
2.756	13.8	20.3	34.1	46.0	-11.9

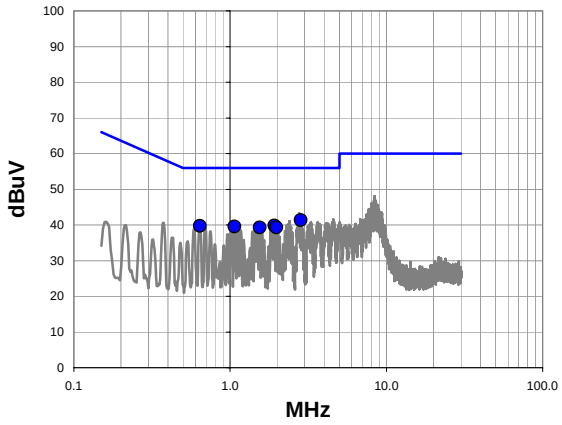
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 149. 6Mbps. Power level 50				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

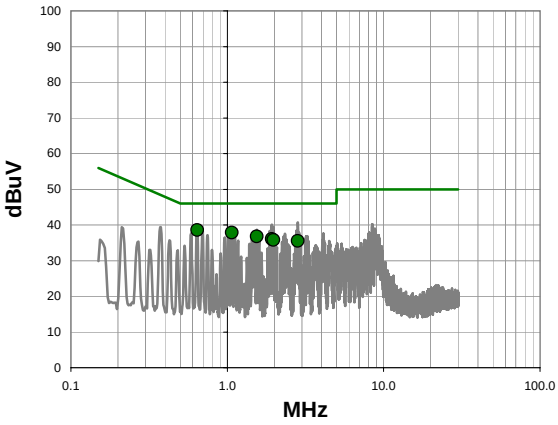
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	21	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.829	21.0	20.3	41.3	56.0	-14.7
1.925	19.5	20.3	39.8	56.0	-16.2
0.642	19.5	20.2	39.7	56.0	-16.3
1.068	19.3	20.2	39.5	56.0	-16.5
1.976	19.0	20.3	39.3	56.0	-16.7
1.546	19.0	20.3	39.3	56.0	-16.7

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.642	18.4	20.2	38.6	46.0	-7.4
1.068	17.6	20.2	37.8	46.0	-8.2
1.546	16.5	20.3	36.8	46.0	-9.2
1.925	15.8	20.3	36.1	46.0	-9.9
1.976	15.5	20.3	35.8	46.0	-10.2
2.829	15.2	20.3	35.5	46.0	-10.5

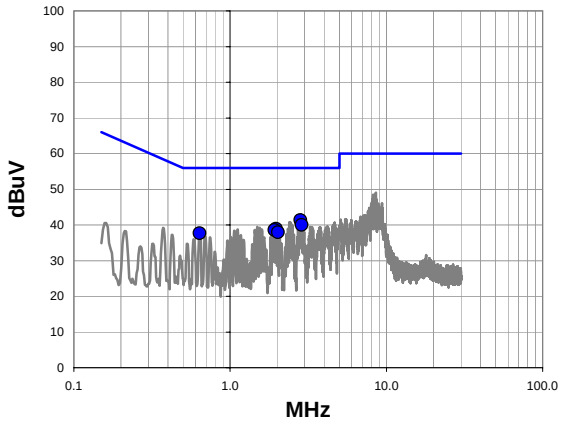
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 149. 6Mbps. Power level 50				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

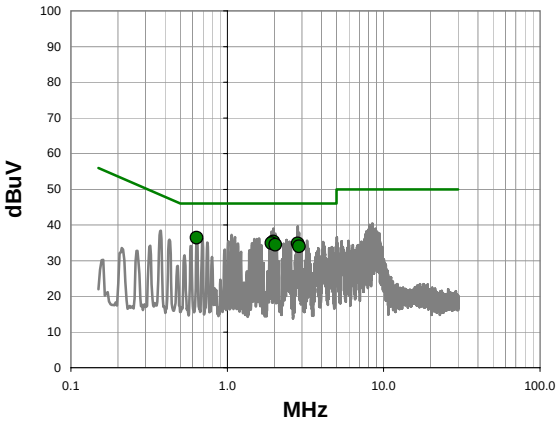
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	22	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.821	21.0	20.3	41.3	56.0	-14.7
2.872	19.7	20.3	40.0	56.0	-16.0
1.972	18.6	20.3	38.9	56.0	-17.1
1.921	18.3	20.3	38.6	56.0	-17.4
2.027	17.6	20.3	37.9	56.0	-18.1
0.638	17.5	20.2	37.7	56.0	-18.3

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.638	16.2	20.2	36.4	46.0	-9.6
1.972	15.0	20.3	35.3	46.0	-10.7
1.921	14.6	20.3	34.9	46.0	-11.1
2.821	14.5	20.3	34.8	46.0	-11.2
2.027	14.1	20.3	34.4	46.0	-11.6
2.872	13.7	20.3	34.0	46.0	-12.0

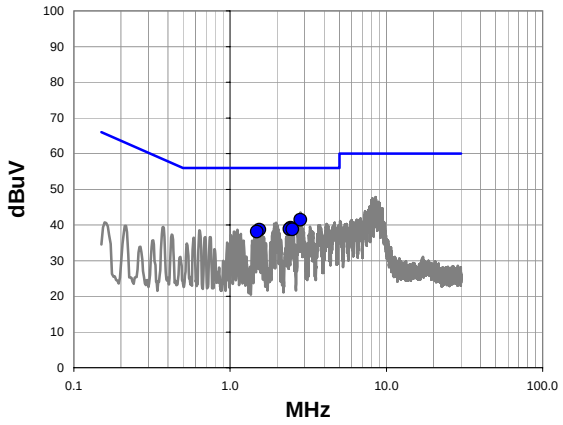
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 157. 6Mbps. Power level 50				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

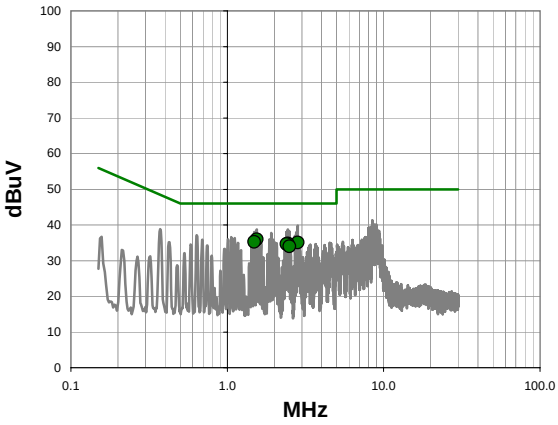
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	23	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.818	21.1	20.3	41.4	56.0	-14.6
2.446	18.9	20.3	39.2	56.0	-16.8
2.395	18.5	20.3	38.8	56.0	-17.2
2.501	18.4	20.3	38.7	56.0	-17.3
1.542	18.4	20.3	38.7	56.0	-17.3
1.487	17.9	20.2	38.1	56.0	-17.9

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
1.542	15.7	20.3	36.0	46.0	-10.0
1.487	15.0	20.2	35.2	46.0	-10.8
2.818	14.7	20.3	35.0	46.0	-11.0
2.446	14.5	20.3	34.8	46.0	-11.2
2.395	14.3	20.3	34.6	46.0	-11.4
2.501	13.7	20.3	34.0	46.0	-12.0

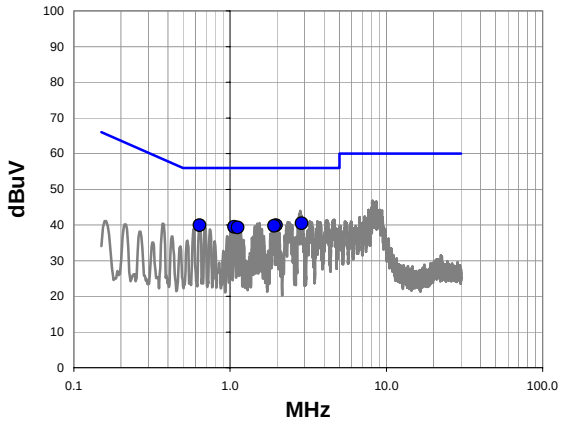
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 157. 6Mbps. Power level 50				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

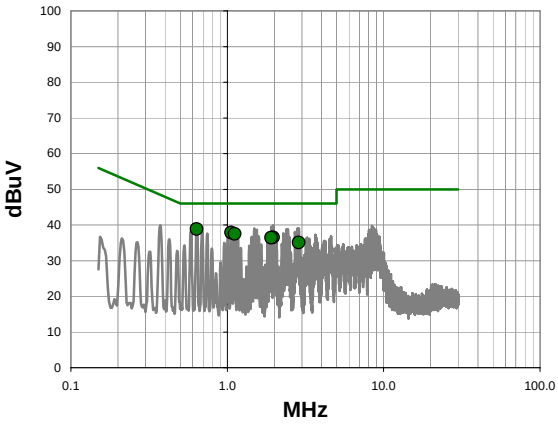
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	24	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.869	20.1	20.3	40.4	56.0	-15.6
0.638	19.7	20.2	39.9	56.0	-16.1
1.968	19.6	20.3	39.9	56.0	-16.1
1.914	19.4	20.3	39.7	56.0	-16.3
1.061	19.3	20.2	39.5	56.0	-16.5
1.116	19.1	20.2	39.3	56.0	-16.7

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.638	18.6	20.2	38.8	46.0	-7.2
1.061	17.6	20.2	37.8	46.0	-8.2
1.116	17.3	20.2	37.5	46.0	-8.5
1.968	16.2	20.3	36.5	46.0	-9.5
1.914	16.1	20.3	36.4	46.0	-9.6
2.869	14.7	20.3	35.0	46.0	-11.0

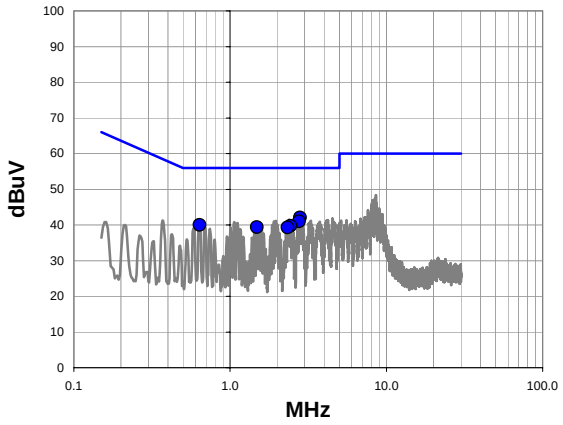
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 165. 6Mbps. Power level 50				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

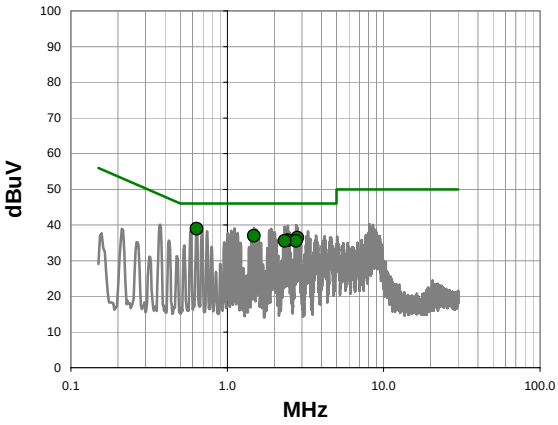
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	25	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.810	21.7	20.3	42.0	56.0	-14.0
2.759	20.7	20.3	41.0	56.0	-15.0
0.638	19.8	20.2	40.0	56.0	-16.0
2.439	19.4	20.3	39.7	56.0	-16.3
1.484	19.1	20.2	39.3	56.0	-16.7
2.333	19.0	20.3	39.3	56.0	-16.7

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.638	18.7	20.2	38.9	46.0	-7.1
1.484	16.7	20.2	36.9	46.0	-9.1
2.810	16.1	20.3	36.4	46.0	-9.6
2.439	15.4	20.3	35.7	46.0	-10.3
2.759	15.2	20.3	35.5	46.0	-10.5
2.333	15.2	20.3	35.5	46.0	-10.5

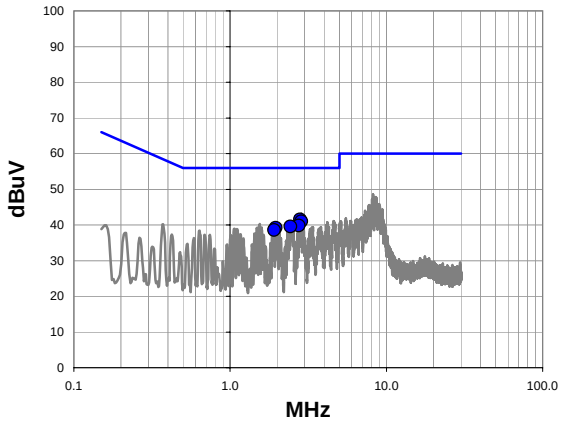
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 165. 6Mbps. Power level 50				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

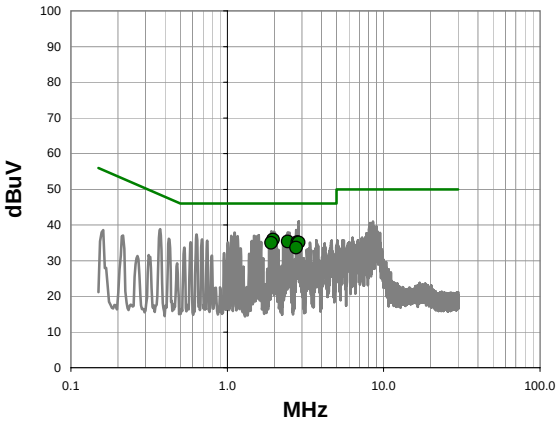
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	26	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.807	21.2	20.3	41.5	56.0	-14.5
2.861	20.7	20.3	41.0	56.0	-15.0
2.756	19.5	20.3	39.8	56.0	-16.2
2.439	19.2	20.3	39.5	56.0	-16.5
1.961	18.9	20.3	39.2	56.0	-16.8
1.910	18.3	20.3	38.6	56.0	-17.4

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
1.961	15.6	20.3	35.9	46.0	-10.1
2.439	15.0	20.3	35.3	46.0	-10.7
2.807	14.8	20.3	35.1	46.0	-10.9
2.861	14.7	20.3	35.0	46.0	-11.0
1.910	14.7	20.3	35.0	46.0	-11.0
2.756	13.3	20.3	33.6	46.0	-12.4